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the future of pastoral peoples
the future of pastoral peoples

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The 1970s have been fraught with upheaval and trauma for the pastoral societies of Africa and Southwest Asia. Drought and famine combined with the pastoralists’ assimilation into larger political systems have resulted in a sense of crisis among them, reinforced by a widely shared perception of threats to their way of life. Although international and national agencies have responded with a mixture of humanitarian relief and assistance for economic development, evidence at the end of the decade indicates that famine relief has often benefited the rich as much as the poor and programs of development have largely proved unsuccessful even in their own terms.

Social science researchers and academics have responded to the sense of crisis with increasing study of pastoralism; accelerated involvement in the design, implementation, and assessment of development programs; and a heightened awareness of their moral obligation to address the problems facing pastoralists.

One outgrowth was the formation of the Commission on Nomadic Peoples, an agency of the International Union of Anthropological and Ethnological Sciences (IUAES), chaired by Dr Philip Carl Salzman of McGill University. The Commission is an international network of scholars and researchers who are concerned with increasing knowledge about the present circumstances and the future prospects of the nomadic and pastoral peoples of the world. Its focus is upon current social, cultural, ecological, and political processes and on alternative modes of development for the future.

Although the Commission members are primarily anthropologists, there are also geographers, economists, and sociologists. Since the founding of the Commission in 1977, membership has grown to nearly 100, representing 18 countries in Africa, the Americas, Asia, and Europe. The program of the Commission is organized around the synthesis and analysis of existing knowledge and theory, the facilitation of research, and the communication of research results and their practical implications.

The Commission has organized a series of meetings, the proceedings of which are in the process of publication. In 1978, a conference on “Nomads in a Changing World” (Salzman and Galaty, forthcoming) was held in London, and a symposium on “Change and Development in Nomadic and Pastoral Societies” (Galaty and Salzman, forthcoming) was held at the IUAES Congress in Delhi; in 1981 a special session on “Planned and Unplanned Change among Contemporary Nomadic and Pastoral Peoples” (Salzman, forthcoming) was held at the IUAES Intercongress in Amsterdam.

At present, the administration of the Commission is at the Department of Anthropology of McGill University in Montreal, Canada, where the Commission newsletter Nomadic Peoples is published and distributed. Nomadic Peoples includes research reports, theoretical and policy discussions, reviews, and reports of current publications. The Commission’s concerns are
shared by several national and international agencies and research groups, many of which were represented at the conference set forth in this publication.

The meeting was conceived as one way in which the Commission could facilitate research relevant to the changes that face nomadic and pastoral societies today. Critical to the conference planning was the objective of enabling constructive discussions among social scientists of pastoralism, representatives of research institutes, and development planners and administrators. In particular, representatives of research institutes or agencies from countries in Africa and Southwest Asia that have substantial pastoral populations were invited to participate.

There were two major challenges for the conference. One was to inform academic social scientists of the concerns, perspectives, and understandings of development planners and administrators so that future academic research may better address their practical needs. The other was to demonstrate that development programs and policies can indeed be enhanced by social scientific knowledge and perspectives. This required that social scientists define the ways that their knowledge and skills can be directed toward the problems identified by those involved in development efforts. At the same time, it was hoped that the academics would raise issues about development as a whole that might elude those more closely involved. In fact, the conference was successful in providing a forum for the exchange of views among persons whose responsibilities differed but who shared an involvement in pastoral change.

Through collaboration between the Commission and the Institute for Development Studies (IDS) of the University of Nairobi and the cooperation of the IDS Director, Professor W. Senga, the conference was held in Nairobi. The East African site was especially appropriate because of Kenya’s pastoral population, its history of significant research on issues of pastoralism, and its proximity to other areas of West Africa and Southwest Asia of relevance for the conference. The Institute for Development Studies has played a central role in the stimulation and sponsorship of significant programs of research on issues of change and development in all domains of East African society. In particular, it supported some early research on organizations of pastoral development and more recently has been involved in the study of projects relevant to the integrated development of pastoral with other productive sectors. The Institute was well represented at the conference with papers by Shem Migot-Adholla and Peter Little, Peter Hopcraft, and John Nkinyangi. The Commission is grateful to Professor Senga for the commitment of the Institute to the conference, to Dr Migot-Adholla for his kind assistance in carrying out preconference organization and arrangements at IDS, and to the staff of IDS for their willing participation in conference preparations.

Financial support for the conference was provided by a number of institutions whose interest in the project was gratifying. A seed grant was offered by the International Social Science Council in Paris, with funds derived from UNESCO. That grant was more than equaled by support from the International Development Research Centre in Ottawa. In addition to providing conference funding, IDRC also suggested collaboration in the publication of the conference proceedings. The conference was attended by one of its technical editors, Amy Chouinard. The Commission is also indebted to the Wenner-Gren Foundation for Anthropological Research in New York for a grant in support of conference participants. Many participants
were able to travel to the conference by means of external support, provided in some cases by their home universities and institutions, thus making possible more economic use of conference resources. Particular acknowledgment is due the Graduate Faculty of McGill University in Montreal, for providing an exceptional grant for travel support.

Background papers circulated before the meeting were written by Dyson-Hudson and Dyson-Hudson (1980), W. Goldschmidt, F.P. Conant (1980), and M. Horowitz (1979); another was produced by the Institute for Development Anthropology (1980). With the exception of Goldschmidt's paper on the "Failure of pastoral economic development programs in Africa," which is part of this volume, background papers are published elsewhere.

The conference organizers requested that contributors not focus on their current and past research results but aim to sum up general conclusions and to pose research questions and programs. In particular, it was hoped that research priorities for the 1980s would emerge and represent the mutual conclusions of researchers, institute representatives, and program administrators and planners. An assessment of the results is included as the first section of this book.

The 5-day conference included daily seminars and three short evening sessions on research activities and programs under way in the three focal areas. Each session included at least one core paper that set forth essential issues and questions and other papers that focused on more specific issues, including case studies. This volume does not follow the conference program in all respects but reflects a reordering of the papers, both to represent some of the organizational insights that emerged and to bring together papers that complement one another.

The discussions that followed the papers were of high quality and represented a range of incisive criticisms, constructive additions, and case studies. They portray the major issues and divergent positions confronting the field of pastoral change today. To preserve the discussion, respondents submitted their questions, comments, and replies in written form immediately after each session.

Each paper in this volume is followed by an edited version of the relevant discussion. This version is an amalgamation of the submitted comments, notes from one of the editor's notebooks, and, in a few cases, taped transcripts. The editors are indebted to Michael Horowitz for making available several transcripts of taped sessions produced by the Institute for Development Anthropology. Because of the exigencies of publication, the editors were not able to send the reconstructed discussions to the contributors for their approval. Thus the editors accept full responsibility for any misrepresentations. If the precision and style that marked many of the original interventions have been inadequately retained, the substance of the discussions renders them of great value to the readers of these proceedings, both in communicating a sense of the actual meeting and in providing a context of criticism offered by knowledgeable persons with divergent opinions in the same area as the contributions. Insights, criticisms, and suggestions in the discussions are those not of the editors but of the participants themselves. Editorial comments are limited to section introductions.

The conference demonstrated the complex mixture of divergences and common ground between the various participants, between developers and
researchers, between natural and social scientists, between pure and applied researchers, and between foreign and national researchers and developers. But most marked was the silent distinction between conference participants, who provide inputs to and actually in some cases make development decisions, and the absent pastoralists, who are affected by those decisions. Written contributions and spontaneous discussion clearly revealed the profound ambivalence all participants felt toward interventions into rural-based societies and economies, and the question was reiterated whether pastoral development programs are themselves part of the problem. The proceedings reflect the range of theories, case materials, and opinions that bear on the problem of pastoral change. The conference did not produce a consensus as to what development should be done, but it was successful in establishing points of controversy and thus identifying what should be investigated. This, after all, was the task the conference assumed.

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research priorities and pastoralist development: what is to be done?
Pastoralists in Ethiopia move to winter pastures.
In global development for nations and for people, livestock-dependent peoples everywhere are losing ground. For some decades, development planners, academics, and pastoralists have, with diverse motives and aims, tried to bolster, modernize, or fundamentally transform the pastoral way of life. Individual pastoralists have sought to cope with pressures they feel by such adaptive mechanisms as labour migration, the increase of herd sizes, the diversification of craft production, or the pursuit of education. Large sectors of, or even entire, pastoral societies have been involved in planned programs and projects of development coordinated by national governments, with the collaboration of administrators, planners, technicians, and extension officers. Until recently, the planners, administrators, and scholars — and in particular the scores of anthropologists who have lived on intimate terms with one pastoral community or another — rarely met except for fleeting moments in the field. Rarer still were agreements among them on programs that might serve the interests of the pastoralists. Alarmingly, as the threats to pastoral peoples have increased, the academics’ plaints have grown more hollow, and the planners’ projects have failed to help. It is a sign of the frustration of all the witnesses to the plight of the pastoralists that social scientists, livestock specialists, planners, and development bureaucrats have, within the last 3 years, begun to come together to search collaboratively for solutions to the profound problems that have eluded all their individual disciplines. The conference reported in these proceedings brought together several streams of thought and action that still search with optimism for positive paths of change.

The crisis of pastoralism is worldwide. It derives from the simultaneous increase of pressures to absorb pastoralists into the nonpastoral economy (through settlement programs, wage policies favouring migrant labour, forced commercialization, a relative drop of the value of pastoral products, and the like) and of measures that directly deprive pastoralists of their former share of economic and political life (by the expansion of agriculture, military patrols, destocking programs, and the destruction of traditional systems of land tenure). The result of these powerful forces is that pastoralism is increasingly being relegated to people too old to change, too poor in alternative skills to leave, or too far away from centres of power for anyone to care yet.

The papers in this volume show regional differences in the decline of pastoralism. In the Middle East those engaging in pastoralism are largely doing so as a fallback, a sideline, or a residual activity around their major occupations. For West Africa, the reports are mixed, with the direct pressures increasing in Nigeria and indirect constraints growing more serious elsewhere. In East Africa, rich and diverse pastoral societies have, in the past, been relatively autonomous. In precolonial and colonial times, the initiatives in the pastoral areas by government authorities were sporadic, only recently giving way to more sustained programs of intervention in the lives of the pastoralists. Across all three regions, the more intense the capitalization of
production in other sectors, the more marginal is the role of the pastoral sector.

If pastoralism were simply an archaic mode of production, one might be reconciled to its passing into history. Some development practitioners view all subsistence-oriented production systems as obsolete and in need of wholesale replacement. Such attitudes have been fed, ironically, by the works of anthropologists, who, in the past at least, tended to overstate an immutable uniqueness of the pastoral way of life. Although the works were valuable in revealing the internal dynamics of pastoral societies, they exaggerated the significance of nomadism compared with other spatial mechanisms of livestock production, the strength of the pastoralists' emotional attachment to their animals, their will to succeed by the building of large herds, and the degree to which they were detached and isolated from their neighbours. The result of exaggeration has been that the works of anthropologists have been used as proof of the inability of pastoralists to adapt to change. For example, a phrase — the cattle complex — coined by Melville Herskovits in an attempt to designate a set of interactive cultural elements, has come, in some quarters, to mean a terminal maladaptation of pastoralists.

Today, anthropologists stress the rationality of local-level systems of livestock production and the links between the local-level processes and larger regional, national, and even international contexts. Rather than being seen as an irrational religious commitment, "pastoral culture" can be viewed as a set of symbolic and ideological assertions about the economic, political, and ecological processes in which pastoralists are rationally engaged. The emerging paradigm emphasizes study of the degrees of relative autonomy and systematic links between the various levels, from micro to macro. It views the pastoralist as one who interacts not only with familiar objects of the pastoral neighbourhood but with a range of institutions, influences, and offices that derive from regional, national, or international sources. In short, this perspective has opened the way for anthropologists to look upward and outward from the local system they knew so intimately, in an attempt to understand the pastoral point of view on the world. Increasingly, this "view from below" sees that development programs, projects, planners, and practitioners are an inevitable part of the pastoral equation, as are regional markets, national governments, and international commodity markets — that is, part of the total set of factors "out there" to which pastoralists must respond.

The developmentalists have also in recent years been gaining a deeper respect for pastoralism as it is practiced in the world's rangelands by contemporary herding peoples. Studies to establish a technical baseline for, or the feasibility of, development projects — studies long accepted in agriculture or engineering — should be carried out. More and more often the livestock developer has come to realize that the practices of pastoralists make sense: animal breeds well-suited to multiple goals, herd management techniques adapted to local conditions, husbandry as up to date as the flow of information and technology permits, land-use management carefully adjusted to long-term social and subsistence insurance. Indeed, more and more frequently, developers are forced to ask whether or not the new technology they have to offer is really an improvement on local practices. A multitude of Western technologies have been tried in country after country with only the most limited success: these include cross-breeding with
European animals, integrated dairying, intensive poultry production, deep wells, grazing reserve schemes, and modern abattoirs. The failure of easy technology transfer as a route to development has driven the development specialists into a willingness to examine local systems more seriously before they begin to attempt improvements on them. Increasingly, it is being seen that the optimal use of semi-arid range resources may involve continuing animal husbandry through extensive pastoralism, rather than radical shifts to new technologies of intensive commercial husbandry or dry-land agriculture.

**pastoral development at a crossroads**

From opposite poles of experience, then, social analysts of pastoralism and planners of livestock development have now converged. They recognize the mutual value of one another’s perspectives on the future of pastoralism. The conference reported here afforded a major opportunity for the two groups to come together and inspect their common ground. This was not the first time they have met. In national research institutes social scientists and planners have occasionally collaborated, especially on specific projects. At the International Livestock Centre for Africa (ILCA), in its work in Addis Ababa, Nairobi, and Bamako, the designing of programs and the monitoring of projects have included both livestock specialists and social scientists. Among the bilateral donor agencies, those of the United States, France, and the United Kingdom have taken the lead in the last 5 years by enlisting multidisciplinary teams and bringing technicians, economists, and social analysts together regularly to review and plan projects and programs.

Nevertheless, most of the meetings between social scientists and technicians have been directly programmatic in nature. Such collaboration always directly pits the relative knowledge of the various specialists against the desire to have a solid impact on the project at hand. To get on with the job of planning, members of the group waive fundamental questions about the general limitations of development goals, particular constraints on programmatic means, and incompatibilities between disciplinary assumptions.

The Nairobi conference was, thus, virtually the first time that planners, practitioners, and analysts could convene in the relative luxury of a few moments of reflection. Projects, existing and forthcoming, were never far from participants’ thoughts, and much of the informal discussion was of concrete problems and projects. But the agenda of formal discussion allowed participants to range much more broadly into issues that divided and united them. From the diversity of approaches emerged common concerns.

**what is to be done?**

The urgency of the current and future situations of pastoralists led all the participants, academic analysts and agency technicians alike, into two levels of dialogue. We asked one another what the immediate priorities for pastoral development were, given the vast range of our collective experience. What technological innovations, communications programs, or policy determinations have worked, and why? What analytic generalizations about pastoral production are now capable of being built into the planning process? From
the growing mutual respect of the last few years, what, if anything, could we now agree upon as recommendations for action?

At another level was our mutual recognition of the need for further research in technical, economic, social, and political areas. A set of priorities for pastoral research emerged. It reflected both an action orientation and an awareness of the grave gaps in our understanding of the basic mechanisms by which rural-based, subsistence-oriented pastoral systems operate, by which pastoralists respond to current pressures and demands.

The recommendations for research and for development are elaborated separately in the following sections, they relate to one another intimately, and action on one cannot and should not proceed without action on the other. Moreover, because the recommendations emanate from the theory and substance of particular topics, readers should refer to the various articles in the proceedings for a deeper sense of the context from which they emerged and were distilled by the editors.

for pastoral development

The conference examined the many sources of tension between the theoretical and applied perspectives of all the actors in development, the difficulties of trying both to participate in development planning and to maintain an effective critical posture toward it, and the ethical dilemma of the posture of neutral detachment (“if you are not part of the solution. . . .”) and of advising with incomplete knowledge. The following priorities reflect some of the practical and ethical concerns; the first six are not limited to pastoral systems, whereas the last five are:

• A local systems approach holds the best hope of success in development for pastoralists. The starting point of planning must be the pastoralist production system, which includes a range of activities and a set of perspectives and understandings that the pastoralists have about their world. A local systems approach does not mean that international and national contexts can be ignored; to the contrary, the goal must be to put that wider information to the service of the local population. Though the definition of local systems may vary and must itself be elicited, the people at that level must be defined as the prime beneficiaries of development.

• Local people must be the subjects, not the objects, of development. Pastoralists must be fully involved in the design and implementation of programs that are to benefit them. Nothing fails like noninvolvement. Consultation with and for them must be demonstrably voluntary and patient. Because whatever happens to a project during implementation depends on whether it is embraced by those for whom it is intended, the only sure way to point it toward success is for it to be embraced from the outset.

• All communities are differentiated, and development work must anticipate the diversity. Involvement and benefit cannot accrue haphazardly to some segments of the community and not others — not to the leaders rather than to the led, not to men ahead of women, not to merchants instead of producers. To treat rural communities as undifferentiated is to court the deepening of rifts in the social structure that will last long beyond projects themselves.
• Social analysis is as important as technical and economic analysis at every stage in development work. For idea formulation and project identification, feasibility and baseline studies, monitoring, and review are vital components, as are careful social analysis and insight for policy and program formulation. Social analysis is not simply a subvariety of economic analysis: technical, economic, and social justifications and consequences can be quite independent.

• Social analysis has dimensions different from other analyses and must be granted its own demands. If projects are to succeed, social analysis must be sound, and if social analysis is to be sound, it must obviously be done well and on its own terms. Social analysis needs longer lead time than do other aspects of planning, so must get under way systematically as soon as programs are foreseen. Short-term research may be inherently questionable in ethical terms unless it is done in the light of full prior knowledge of an area or a full range of relevant data. In many cases a research and pilot phase for projects is warranted before any serious intervention takes place.

• National research and planning institutes should be developed and supported. The best social analysis may be done by members of local teams who command the detailed knowledge necessary for an adequate short-term study. Where national expertise and institutional resources do not yet exist, they should be encouraged as a vital element in appropriate development strategies. Also, members of the communities to be affected have rights to develop their own capacities to digest information made available through research, because such information may be used by them, as well as by developers, to plan their future. Procedures for local training and commitments to a reciprocal relation with local communities with respect to the acquisition and use of knowledge must be made part of development.

• Settlement programs should never be ends in themselves. Settling nomads or seminomads can exacerbate ecological deterioration, diminish pastoral productivity, deny producers vital resources at particular times or places, and otherwise radically disrupt pastoral systems. Because there is good evidence that pastoralists will settle on their own when sedentarization is seen as desirable or appropriate by them, or when resources and technology permit, there is no technical justification for sudden or forced programs of sedentarization.

• Pastoral production is normally and correctly part of wider production systems; changes in any element have ramifications in all others. Pastoralists may also cultivate or engage in craft work or the sale of their labour power; in any case they interact with others who do these things. Changes in production must be planned in the context of the total regional economy and society. Pastoralists’ own perspectives are a first guide to projecting the consequences of change. After all, they know far more than do outsiders about local conditions and the ramifications of change.

• Pastoralists’ landholdings must be respected in law. In many cases, pastoralists have historical claims to the homelands that they inhabit; in others contractual relationships, time-sharing agreements, or the opportunities of recent history afford access to grazing lands. Too
often, planning agencies have viewed all such claims as equivocal or trivial and have seen pastoralists as having surface usufruct or squatting rights at best. To the contrary, Article Eleven of Convention 107 of the International Labour Office, of which most countries are members, provides that "the right of ownership, collective or individual, of the members of the populations concerned over the lands which these populations traditionally occupy shall be recognized." Neither planners nor social scientists, certainly not international development agencies, should lend their weight to any program that would diminish that right in fact or in law, at least until such time as pastoral communities decide for themselves that it may be wise to do so. Range management planning bears special legal implications that should be further investigated and carefully considered.

• The traditional "quick fixes," especially through the provision of veterinary services and wells, have in many places become part of the pastoral problem and should be prescribed judiciously. Animal health programs have accelerated animal population growth, and water provision has triggered both range degradation and the concentration of human and animal populations. Whereas there is some development justification for the traditional emphasis by government livestock programs on health and water services, this route has led to an institutional inertia and popular demand for their enlargement. Once again, however, the total local system should be the starting point of analysis and planning, and the wider environmental, social, and economic implications of extending veterinary and water programs should be considered.

• The market for meat is a poor guide to the needs of the pastoral sector. Planners must not see the (urban) meat demand as the key criterion for justifying intervention in the livestock sector. Such a bias leads to undue emphasis on site selection for efficient production, on the meat function rather than dairy and draft functions of animal production, and on beef production rather than on a balance of livestock classes. The result can be investment policy recommendations directly deleterious to the pastoral population. The livestock-dependent people must be the primary subjects of policy, not the need for meat supplies (to urban residents). In many pastoral areas, offtake for market already approaches the maximum possible without damage to herd reproduction.

for pastoral research

The most significant emphasis of conference participants was upon the political economy of pastoralism. Without ignoring the factors internal to pastoral production, they recognized the effects on local systems of factors at the regional, national, and international levels that relate to forces of the market and the state. In most cases of current development planning, the individual nation-states and their agencies have been taken as givens and thus not considered important subjects of inquiry. Yet the macropolitical and economic factors are of critical importance, as any comparison of develop-
ment strategies and achievements across nations will attest. As national and international development practitioners and pastoralists choose among alternatives in specific situations, their recognition of the importance of variables from the political economy can enhance the process of analysis and decision, even in technical and ecological fields.

The rapprochement of anthropologists and development planners has been accompanied by a realization of the awesome gaps in knowledge that bedevil attempts on the academic side to generalize and on the development side to plan with confidence. Conference participants agreed that substantial areas of research have yet to be done on most development-related pastoral issues. This acknowledgment flies in the face of pressures in government and international agencies to "do something," for there is at present neither a consensus on the agenda for what should be done nor sufficient knowledge of how to do what is felt should be done. These assertions are not meant to sanction a simple continuation of research by foreigners and according to a research agenda set externally. Research institutions and programs in countries with pastoral populations must themselves be further supported and elaborated and be better financed. Researchers must be trained. Perhaps most important, pastoral communities and their leaders must find ways to define their own needs for information, so that they themselves can develop their research agenda. Research that is action-oriented, community-centred, and executed with sensitivity and thoroughness simply must always have a place in pastoralist development.

Research needs are broad and are set out here in categories convenient to the arrangement of the papers in this volume. Relationships between items in different categories are numerous and can be seen in the papers themselves.

influence of the state

The encapsulation or “capture” of local pastoral societies through political (including sometimes military) means and the expansion of government control are a general research priority encompassing many specifics enumerated here and in other sections. We need to know more about:

- The influence of national development strategies and goals on government plans for pastoral regions and on the perceptions of and attitudes toward pastoralists held by people in power, including politicians, administrators, and ministry specialists. To what extent are development strategies for agricultural sectors inappropriate for pastoral sectors and to what extent does the pursuit of one development goal (e.g., increased marketing of livestock) contradict another (e.g., better nutrition)?

- Ethnic and regional factors in state-local contrasts and conflicts, which often take the shape of mistrust of pastoralists' ways of life.

- Channels of potential influence by local communities on national and local level political processes.

- The impact of national systems of stratification on pastoral communities and the roles of "new elites" of emerging pastoralist power and economic brokers.
regional perspectives

Far more livestock raisers are part-time crop raisers than are solely dependent on livestock. Even among full-time pastoralists, mixed agropastoralism and relations with agricultural communities are growing. In each region, planners need to have detailed information on:

- The impact of small towns and service centres on pastoral societies.
- The influence of the expanding national infrastructure — roads, other transport systems, communications technology, large-scale water projects, and the like — on local pastoralists.
- Models for the cost-efficient delivery of government services, such as for education, human and animal health, and economic information.
- The significance of the relative social and spatial isolation and autonomy of pastoral communities on pastoral production, sociopolitical participation, and communal differentiation.

the market

Livestock products are everywhere taking on a growing importance in regional, national, and international trade. Indeed, the rapidly growing demand for meat in the urban areas of East and West Africa and the Middle East may now constitute the single most profound factor affecting pastoral production systems. The effects of increased trade are both positive and negative. We urgently need information on:

- The significance of the commoditization of pastoral production to pastoral social and political systems. Does the increased use of the market significantly alter local-level systems?
- The trends in terms of trade for pastoral products, especially the relationships between grain and livestock production in particular regions.
- The structure and impact of distortions of a "free" market, including national pricing policies, the distribution and control of marketing facilities, the problem of internal trade barriers, and the operations of illicit markets.
- The impact of capital-intensive or government-favoured livestock operations on small producers.

household economy

In most places in the Middle East and Africa today, livestock raising is still primarily oriented to subsistence. Strategies of nomadism, herd management, animal husbandry, and marketing are all designed by pastoralists primarily to serve their domestic economy. As with family production operations everywhere, therefore, altered configurations of family labour and collective resources can have immediate effects upon the whole operation. Before assessing potentials for change or continuity, we need data and trend indications on:

- The demography of herders and herds and resulting labour allocation and practices.
- The division of labour by age and sex and productivity.
- The mix of enterprises in the family operation, including both subsistence and market production.
• The distribution, significance, and maintenance of rights in the production system, including relations of ownership versus management, rights to products versus rights of inheritance, and especially including the rights and prerogatives of women.
• Strategies of herd and human movement and the implications of mobility for household structure and relations between the household and regional institutions.
• The significance of alternative income sources, both within the pastoral system and outside, especially through labour migration.

pastoral resources

The resources available to pastoralists are too often seen to be the only important issues in what is seldom regarded as a fully social system of production. Pastoral resources cannot be neglected, even if the pastoralist is nowhere the “father of the desert.” We need to know the complex relationships between pastoral systems and semi-arid land environmental resources. Such research is now being carried out by the United Nations Environment Programme (UNEP) through its Global Environment Monitoring System (Croze and Gwynne p. 340), the International Livestock Centre for Africa, and UNESCO’s Integrated Project in Arid Lands and Traditional Livestock Management Project. Specific questions that must be widely addressed are:
• What dynamics are involved in gaining and securing access to pastoral resources? What are the traditional land tenure systems and mechanisms for competing with alternative land-use possibilities? How have these changed in recent years?
• What are the implications of various water development and storage practices for pasture use, herd and family movement, and social equity?
• What traditional institutions serve to regulate patterns of land use and conserve pastoral resources and to what extent does the “tragedy of the commons” argument apply? What changes have occurred in these traditional mechanisms for resource conservation and management? What effects have resource management schemes implemented by outsiders had on pastoral productivity?
• What is the impact of external changes and altered constraints with respect to resource use and production objectives on traditional range practices? Specifically, what effects do consumer preferences for beef and mutton have on rangelands that in the past included a broad mix of animal classes?

conclusion

These priorities represent key issues in the study of pastoralism, and they represent in aggregate the knowledge that would form the basis for informed programs of planned change. In particular, they address the issues that have been coloured less by research-based knowledge and evidence than by development ideologies or myths derived from anecdotal evidence or cases. The list excludes many issues that do not bear directly on economic development.
Development decisions regarding pastoral peoples are not based solely on the goals of avoiding increased rural inequality, increasing local inhabitants' control over their lives, and improving the productivity and thus the benefits of the livestock sector. Rather, they are based on politics and are subject to influences and pressures of diverse sorts. If some of the myths of development finally fall in the face of the data, however, then at least the scientific advice to policy planning will have advanced.

The growing disquiet on the part of development planners, expressed in this conference, suggests that perhaps the time has come for anthropological research to address the issues of development, directly through the study of development programs and the development process and indirectly through the more scientific apprehension of the parameters of pastoral systems. Anthropologists often mediate between development planners and pastoral peoples and must face unavoidable ethical issues in discussing and carrying out the priorities for their own activities. Among the central new realities of the 1980s needs to be an increase in the volume of the voices of the pastoralists themselves, as they take hold of their own futures.

John G. Galaty and Dan R. Aronson
Commission on Nomadic Peoples
opening addresses
Maasai girls carrying water illustrate the essential contribution children make to pastoral production.
The opening addresses focused on several themes representing a fitting framework for the week-long discussions. First, semi-arid and arid lands represent valuable productive resources in the context of world food production; yet their most appropriate use — for livestock production — remains little developed. For development planners, the key question is how to establish the basis for sound livestock production systems in areas primarily used for subsistence pastoralism. Second, the pastoral sector receives little development attention, partly because of its lack of political influence; the development that does occur tends to bypass pastoral peoples or to undermine their positions within their own territory. An ethical problem is that optimal use of semi-arid lands for the national and international benefit may adversely affect the future of the people to whom the land belongs. The problem is multifaceted and is apparent even in the holding of a conference in which the future of pastoralists is discussed mainly by outsiders.

Professor Musangi of the University of Nairobi encourages consideration of two basic issues: the relation of ethics to economic development and the obligation of protecting the rights of pastoral peoples while considering their development within national goals. He suggests that priorities for research in the 1980s be based on interdisciplinary perspectives and collaboration.

Professor Salzman of the Commission on Nomadic Peoples contrasts the roles of the adviser and the advocate and suggests that the functions of academic researchers include both roles, as they serve in development agencies or ministries as well as in the capacity of representatives and mediators for pastoral peoples. Above all, he maintains that the pastoralists must not be considered as target populations but as decision-makers and collaborators in the determination of their own futures.

It is important that national social scientists be involved in research of a practical and development-oriented nature. However, the ethical issues that face foreign social scientists are not alleviated for Third World scholars, who may often be closely tied to government agencies involved in development planning.
the future of pastoral peoples

R.S. Musangi, Deputy Vice-Chancellor, University of Nairobi, Kenya

The future of pastoral peoples is very relevant to Kenya, and my colleagues and I look forward to the findings of this conference. To those of you who have come from outside Kenya, let me take this opportunity to welcome you and to wish you a pleasant stay in the country.

Pastoral development provides a unique opportunity to improve livestock industries, particularly for protein production in a world short of protein. It also provides an opportunity to examine the social and economic patterns of the pastoral areas, such as nomadism and collective use of resources. Great attention has, in the past, been given to agrarian development and relatively little to the pastoral sector. Yet in many countries of Africa and the Middle East, pastoral production constitutes a crucial component in local subsistence, a key commodity in export markets, and a substantial portion of national land. In Kenya, for example, a country noted for a well-established agricultural economy, more than 75% of the land is arid or semi-arid, exploited mainly by livestock producers.

Without preempting the outcome of discussions, I would like to suggest that this conference attempt to address two important issues in the development of pastoral peoples.

First, issues related to ethics and economics are frequently posed when it comes to pastoral development. Unfortunately, they are often cited to contrast development with tradition. They should be viewed in the context of transformation of land from mere rough grazing into systematic dry-land agriculture such as the transformation of herd management orientations from traditional subsistence systems to organized meat production and marketing.

Second, there is the obligation to protect the inherent rights and economic security of pastoral peoples, including their right to control their land and at the same time to develop within national goals.

Development for pastoral people is a social and political, as well as a technical, process and if the connotations of progress inherent in the notion of development are to be encouraged, there must be an increasing awareness of the need to learn from past mistakes and to change future orientations. In this respect, the role of technical and social research is indispensable. Universities must be actively involved in development through the research function of merging conceptual progress with practical realities.

The program of this conference, which recognizes the international scope of the problem of pastoral development, is primarily to enhance interchange between three groups with distinctive roles:
• Academic researchers with specialized concern with pastoralism, from the social scientific perspectives;
• Representatives of research institutes with much broader development responsibilities; and
• Personnel associated with national and international agencies charged with practical tasks of development.

The orientations of these three groups may never be identical, or even in harmony, because their aims and obligations differ. It is, however, expected that all must work to ensure that such orientations as the theoretic and applied, the social and the technical, single problems versus integrated frameworks, or even long- versus short-run perspectives serve as mutually complementing and stimulating views, rather than isolated poles.

A problem such as pastoral development is intrinsically interdisciplinary. The links between disciplines, as well as levels of orientation, should be optimally reflected in the dialogue at a conference like this where it is also expected that a synthesis of views will be developed. Certainly, the general social scientific tradition of intensive field research in an important area of pastoralism, with attention given to the perspectives of people defined as social units, should be challenged to broaden itself through taking account of other important disciplines such as range management, agricultural economics, geography, and ecology, which contribute to the understanding of pastoral development.

Finally, the topics of the conference represent substantive areas of research, none of which are planted within any one discipline but which can benefit from the contributions of many fields. The interdisciplinary view is served by collaboration between individuals of different expertise and by the openness of individuals to diverse currents of problem orientation and theory. As the conference moves to define the priorities for research, I hope that contributions tally with the demands for the solution of the problems and that the conference will serve to crystalize points of agreement as well as differences, if not on solutions and approaches, at least on the problems that lie at the heart of the development of the crucial but complex pastoral sector.

In conclusion, I wish this conference great success and I now have pleasure in declaring it open.
some remarks on the roles of advisers and advocates

Philip Carl Salzman, Department of Anthropology, McGill University, Montreal, Canada

I am not a pastoralist. I do not own livestock, do not herd livestock, do not husband livestock. I do not require access to pasture, watering holes, or salt licks. I do not depend for my livelihood upon the well-being of livestock or upon the favourable disposition of markets and authorities to livestock. This means that I do not have an immediate, material stake in pastoralism, that I am not at risk from the tribulations, recurrent or unique, cyclic or cumulative, of pastoralism. I am also uninvolved in the sense that I am safe, protected, and sheltered; and dissociated in the sense that I am independent, self-sufficient, and distant.

I do not produce milk and meat; I produce arguments and documents. I do not husband animals and organize herding groups; I husband ideas and organize conferences. My interest in pastoralism is an academic one. I am interested in two senses: I find pastoralism an intellectually stimulating subject of inquiry, and my livelihood depends to some extent upon my producing arguments and documents about pastoralism. My interests are neither the same as those of pastoralists nor held in common with them. Consequently, when I speak about pastoralism, I speak as an outsider, with little risk. And speaking thusly is presumptuous in that a right to speak about the interests of others is presumed. It is worth reflecting upon the basis of this presumption.

There is a second respect in which I am an outsider: I am a foreigner in countries that have populations of pastoral people. I do not live within the constraints imposed by the circumstances and resources of those countries, nor is my personal destiny tied in any direct way to developments, beneficial or harmful, in those countries. Once again, because I am not a compatriot, I do not share the risks or pay the costs.

In yet another respect I am an outsider: I am an academic with largely scholarly and theoretical interests. My work has little of a directly practical character; I am not very much involved in applied anthropology. Even less do I have any practical responsibility as a planner or administrator. And because the problems that we are concerned with — those bearing upon the future of pastoral peoples — are preeminently of a practical nature, I find myself somewhat disinvolved and distant, in spite of my sentiments and concerns.

Now I have gone on at some length speaking about myself, stressing my separation from the subjects of our concern and from the tasks at hand. I
have started with myself as a referent, but what I have said applies to one
degree or another to almost all of us here: few of us at this conference on the
future of pastoral peoples are pastoralists. Many of us are foreigners. Most of
us do not have any practical responsibility, in either planning or administra­
tion of programs bearing directly upon pastoral peoples. Many of us are or
have been advisers or advocates of practical measures that would affect
particular pastoralists, but some of us have not been involved even to this
extent. So the distance and the safety of which I have been speaking are
shared to some extent by most of us here.

The safety and distance of our individual positions raise in my mind the
question of our right to advise and to advocate, of our right to intervene in
ways, from analysis of current problems to recommendations for policy, that
could have profound effects on the lives of pastoralists, that could impinge
upon the interests of pastoralists as they themselves define their interests. Do
not misunderstand me: I neither ignore nor denigrate the import of our
professional expertise and its potential for making a constructive contribution
or our disinterested concern with its component of altruism. But I do see
something of an ethical dilemma in interfering in the lives of others from a
safe distance. What right have we to act, even given the best of intentions
and profoundest knowledge, when we are not subject to the consequences of
our acts?

It is hardly difficult to be aware of an ethical dilemma; certainly we are
faced with dilemmas such as this continually in all aspects of our lives. It is
even less difficult to find a myriad of good reasons not to act. The more
difficult question is how to circumvent the dilemma satisfactorily and to lay
the groundwork for action that can be considered justified under the
circumstances.

I would like to begin a consideration of this particular dilemma, the right
of the safe outsider to intervene in or to ignore the lives of pastoralists, by
reference to the concept of liberty, especially to the distinction, discussed by
Isaiah Berlin (1969), between the negative and positive concepts of liberty. I
shall not attempt to convey the subtleties of Berlin's elegant argument, so I
hope the simplicity of my summary will be forgiven. The negative concept of
liberty emphasizes one's ability to act without constraint and interference
from others. This is the classic, 19th century English concept associated with
John Stuart Mill. The positive concept of liberty emphasizes the ability to
fulfill oneself through development of one's real nature with no artificial
hindrance. This is a continental perspective of Hegelian derivation.

Each of these notions of liberty can be seen as a criticism of the other.
From the perspective of the positive concept, the negative concept is highly
inadequate: What is the good (it would argue) of being left to act
autonomously if one does not have the resources, spiritual or material, to act
in an effective fashion? Is this liberty, to be not interfered with when one is
starving, not to be constrained from living as an animal? But from the
perspective of the negative concept of liberty, the positive concept is intrusive
and thus self-contradictory: to define the terms of fulfillment (it would argue)
is to constrain one from being oneself. Must we then ensure that people fulfill
themselves, even if they "in their ignorance" would not act to do so? Does
this not put us in the position of forcing people to be free? This is liberty?

Now, what I would suggest is that in the role of adviser and advocate we
are put in the position of being adherents of the positive concept of liberty.
We analyze "problems"; we indicate goals and means to those goals; we speak to the "needs" and "interests" of the "target population"; we project the "improved" state of affairs that will be the consequence of implementing our advice; we act, in short, to provide conditions in which our "clients" can "improve" themselves or develop their potential, their "better" selves. We can thus find ourselves — and I am here painting the bleakest position, one that we are prone to take by the nature of our tasks, even though we may be aware of the problem and attempt to avoid it — acting in what we take to be "interests" of pastoralists but in actuality acting against their wills, preferences, and sense of who they are. By acting, whether purposely or inadvertently, as adherents of the positive concept of liberty, we are taking responsibility even though we are not responsible, are establishing conditions and constraints even though we are not subject to them, are generating consequences even though we will not suffer them.

And, yet, how can we hold the negative concept of liberty and fulfill our role as adviser and advocate; how can we hold the negative concept and do good where it is needed? Is it desirable to leave pastoralists to their fates? Do they not need support, assistance, protection, encouragement, and guidance under the new and trying conditions of the modern world? Must we leave them to be free to starve, to fall behind, to stumble under the burden of their ever heavier lot?

Dare I propose an answer to this dilemma? Or perhaps the real question is whether we dare to avoid addressing this dilemma, for if we do not try to answer it, where will we be? What I would say, the answer I would propose — and I certainly claim no special originality here — is that we propose, and the pastoralists dispose; that is, we advise and advocate, and the pastoralists decide. In this way, we can bring to bear our honest disinterestedness and our informed expertise for defining alternative courses of change and development, alternative kinds of projects and forms of assistance, and for specifying the consequences — economic, social, and cultural — of choosing one or the other of the alternatives. The pastoralists would then have to make a choice — and the ways in which such decisions might come about require separate consideration — according to their best judgment. Thus the pastoralists themselves would determine to the greatest possible extent their own destiny, rather than having their destiny determined for them by outsiders. And we, as advisers and advocates, would not be put in the false position of taking responsibility where we cannot be held responsible and putting others at risk while we ourselves suffer no risk.

I am reminded of the repulsion I have felt from time to time when encountering self-proclaimed enemies of pastoralists, of nomads, of tribal peoples; enemies with diverse origins and situations, from that of centrally appointed regional governor to that of reconstructed, reeducated, recultured tribesman; enemies with, to be sure, the best of intentions and also the best of certainties about what would be best for the poor, benighted pastoralists. "They are poor, ignorant, dirty. They do not like to work. They move around for no good reason. They are backward, hardly better than animals in their habits. They need progress, or modernization, or civilization; they need to settle in villages, have bath houses and schools, and learn to speak our language" so the refrain goes. Well, these are certainties that are less than certain to me. What I am more certain of is that I see no particular good
reason that such certainties should be imposed upon pastoralists, and even less reason that outsiders should be involved in such imposition.

This is why I believe it morally imperative that pastoralists not be target populations but decision-makers, not recipients of programs but collaborators in the formation of such programs, not pupils but consultants, not dependents but independent actors. Our job should not be to constrain choices but to enable them, not to impose solutions but to facilitate decisions about alternative solutions.

Now it is always ennobling to do the right thing, to do the moral and ethical thing, and so to do good. But there is more than doing good in allowing pastoralists to choose for themselves. There is also the possibility of doing well, in the sense of working effectively, by letting people make decisions for themselves. And we have not, so it seems, been doing very well. According to many authorities, as exemplified by Goldschmidt in his background paper, we have not been doing well at all, for our proposals and our projects for modernizing and developing pastoralists have not been succeeding in terms of their own objectives. What I would suggest is that one major reason for the high rate of failure is the lack of participation of the pastoralists in the planning and in the decision-making. Exactly the way in which lack of pastoral participation in planning and decision-making hurts the projects might vary; perhaps, some projects are not well-conceived because the extant pastoral system is ill-understood. Perhaps the multiple consequences of the project, whether in the sphere targeted by the objectives or related economic, social, and cultural spheres, are not taken into account. Or perhaps the project is well-conceived, but because it is imposed from the outside and because the pastoralists have not participated in its construction, they have no faith in it and no commitment to it and thus do not give it a chance. Whichever one or combination of these factors is at work inhibiting the success of our projects, active participation of pastoralists in all phases of planning and decision-making will improve prospects for success. And with luck, we can be doing well by doing good.

But if the solution to our problems, or at least some alleviation of our difficulties, is so obvious, why have we for the most part not included pastoralists in planning and decision-making? The reasons are several, some political and some cultural. One reason is our stereotype of the pastoralist. Once again, I would like to draw upon the apt insights of Isaiah Berlin. Quoting the Greek poet Archilochus who says, "The fox knows many things, but the hedgehog knows one big thing," Berlin (1978) argues that

... taken figuratively, the words can be made to yield a sense in which they mark one of the deepest differences which divide writers and thinkers, and, it may be, human beings in general. For there exists a great chasm between those, on one side, who relate everything to a single central vision, one system, less or more coherent or articulate, in terms of which they understand, think and feel — a single, universal, organizing principle in terms of which alone all that they are and say has significance — and, on the other side, those who pursue many ends, often unrelated and even contradictory, connected, if at all, only in some de facto way, for some psychological or physiological | or, I would add, social | cause, related by no moral or aesthetical principle; these last lead lives, perform acts, and entertain ideas that are centrifugal rather than centripetal, their
thought is scattered or diffused, moving on many levels, seizing upon the essence of a vast variety of experiences and objects for what they are in themselves, without, consciously or unconsciously, seeking to fit them into, or exclude them from, any one unchanging, all-embracing, sometimes self-contradictory and incomplete, at times fanatical, unitary inner vision.

Thus the single-minded hedgehog and the multiple-interest fox. And how does this bear upon our stereotype of the pastoralist? What I would argue is that we tend to see pastoralists as hedgehogs, knowing one big thing, subsistence livestock rearing, very well, being highly committed and single-mindedly focused upon herding and husbandry. It is because we see pastoralists as hedgehogs, narrowly focused and single minded, that we, or many of us at least, do not think that pastoralists are up to dealing with the rapid changes and extreme complexities of the modern world. How could these pastoralists, goes the hedgehog stereotype, take into account the supralocal, the national, the international influences that impinge upon them; how could they understand the complex consequences of continuing as they are or shifting this way or that; how could they choose intelligently between alternative courses of action? The pastoralists, continues the stereotype, know only one thing, even if well, and although it was once a big thing, it is no longer big enough or apt enough. So, the argument based upon the stereotype would conclude, pastoralists are hardly competent to be collaborators, consultants, and decision-makers.

My view is contrary to the stereotype of pastoralists as hedgehogs; I would say that most pastoralists are much more like foxes, pursuing many ends and moving on many levels. It has often been observed that, whatever our ideal—typical conceptualization and whatever the special claims of folk ideologies, so-called pastoralists are almost always involved in a number of productive activities other than raising livestock. I myself have argued that most so-called pastoralists are in fact fully involved in multiresource, mixed economies. And Rada Dyson-Hudson (1972) has demonstrated that peoples’ claims that they are primarily pastoralists can be gross distortions of the behavioural reality. More recently, Harold Schneider (1982) has argued that we misunderstand what pastoralists are up to if we think they are producing food to consume; rather, pastoralists view livestock in a much more flexible, open-ended, opportunistic fashion. “These animals,” Schneider states, “to one degree or another play the role of . . . money, media of exchange, stores of value, standards of value, liquid reserves, standards of deferred payment and means of deferred payment,” and are thus “. . . wealth, an asset to be manipulated in whatever way will bring the best return.” This means, in the more or less usual multiresource economy, that each owner plays off the resources of the livestock sector against resources in other sectors of involvement. Does this not, in fact, fit in with our image of the family head, who is not to be found in the pasture chasing animals but is instead either coordinating the multiple activities of various dependants or gathering information from peers about the conditions and circumstances of all the sectors in which he has interests? Yes, the successful family head is usually very foxy, both in the sense of being involved in many different things and in the sense of making astute judgments about a multitude of tactics and strategies and transactions. These pastoralists, I
would argue, are well-suited to involvement in planning and decisions about their future and the fate of their children.

discussion

Sandford: The notion of "let the pastoralists themselves decide" cannot be dissociated from the social structure and the question of how they decide and who decides. That is, one cannot differentiate the principle of pastoralists' making their own decisions from the precise way this will be done. If the existing political and social structure in pastoral society is inequitable, the decisions will also likely be inequitable.

Willby: The comments made early in the paper apply just as well to most forms of external development aid and not just to development of pastoral economies. However, much of what is said is only being wise after the event. A major handicap (in drawing on pastoral perspectives) has been weak participation of pastoralists in national governments and other institutions due generally to poor education, etc.

Awogbade: This paper concentrates on pastoralists (as an entity) rather than on all poor rural peoples. Instead, pastoralists should be seen as part of the total population of neglected rural dwellers whose environment has been subjected to physical and socioeconomic changes. In this respect, it would be desirable to ask what role these people should play in their own development and how they should be prepared. No society is static, and the theory based on a nomadic stereotype must be viewed with caution.

Ssennyonga: The first part of this paper highlights the moral and ethical issues that an academic faces. It assumes each academic deals directly with the pastoralist. The second part represents a changed position; the academic identifies with development changes initiated among the pastoralists that may have gone wrong. The author does not tell us how he has participated — did he directly initiate change or was he advising the government or other agencies? If the latter, then there is now an intermediary between the anthropologist and the pastoralist. I would have liked to hear more about the relationships between the three — scholar, government, and pastoralist. For example, the anthropologist now finds himself merely consulted by those who make changes. In Third World countries, the native scholars' funds come from their own government, and less detachment is expected of them. At stake is the future not only of the pastoralist but also of the anthropologist.

Salzman: As the title of the paper indicates, the anthropologist-adviser — whether to pastoralists or to outside agents — finds himself or herself in an ethical dilemma. This problem is compounded for Third World scholars, who depend upon their government for funding, because their direct interests are then tied to government, with its power to impose changes on pastoral (or other) peoples. Therefore, in my view, the anthropologist is obliged to press for local decision-making.

Horowitz: Salzman has addressed the ethics of decision-making. In practical terms, most rural development in the last 30 years or so has been imposed, and we all agree it hasn't worked with transhumant and migratory peoples. There is a wide discrepancy between what is happening and what we think is happening with these peoples. It would be beneficial to have more shared
information and informed speculation about the likely consequences of various development projects.

Mpaayei: Pastoral communities — the Maasai for instance — are not static. They respond to change, and they themselves change individually and as communities. They are not the same people they were; in 1911 when the Maasai in the south of Kenya were separated from the Sampur in the north, the two groups dressed exactly the same. Now they look quite different after only 70 years.

Carr: There are other myths about pastoralists. For instance, changes are not always in response to external forces; they may be internally generated.
the role of anthropology in pastoral development
Tending cows and their calves is one task that the Larim women of Sudan may be called upon to do; other tasks pastoral women undertake include the distribution of food within the household and the sale of dairy products. The division of labour closely relates to the decision-making and strategies within each household and is a focus of anthropological research.
The failure of many programs of pastoral development has been attributed to the lack of input from anthropologists and other social scientists who have the most intimate knowledge of pastoral groups. Development planners have accused anthropologists of providing negative advice and of being unwilling to accept the inevitability of change and the responsibility for guiding it. This set of papers accepts the challenge and outlines roles that anthropologists can play in development.

Aronson contrasts "pastoral development" concerned with resources, with "development for pastoralists," which is concerned with people. He claims that research should go beyond this polarization to determine the influence of technological innovations on people. Goldschmidt, in contrast, draws the line sharply between the development planners involved in ill-conceived programs of technical aid and those who pursue an anthropological approach to economic development, which "starts with a recognition of the character, values, needs, and organization . . . in a population and builds its development plans on this base." Horowitz calls on researchers to "provide the scientific bases for development efforts that enhance rather than limit the productive capacity of pastoral herders and that increase rather than diminish the opportunities they have to make meaningful choices about the direction of their own lives." He recommends that Third World scholars and research institutes be given greater encouragement to become involved in development efforts and that social scientists be incorporated in development agencies at the stage of planning and implementation rather than later for evaluation and assessment. Bates and Conant set forth a plan for a handbook on livestock and livelihood that would coordinate anthropological research on pastoral development. In a second paper, circulated before the meeting, Goldschmidt provides details about the failures of development programs conceived without adequate input from social scientists. The contribution of Marx emphasizes the role of anthropologists as mediators between development agencies and people experiencing programs of change.

The papers set forth diverse views of the anthropologist as academic researcher, development planner, and political mediator, but in each case the challenge to and responsibility for action are accepted. The resulting research priorities include pastoral ecology and desertification, resource access and use, the organization of labour and domestic production, regional relations, the political economy of pastoralists, and the process of development.
development for nomadic pastoralists: who benefits?

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“Pastoral development” and “development for pastoralists” are not at all the same thing. In discussions of the future of the world’s arid and semi-arid areas, these phrases signal two widely divergent development orientations. “Pastoral” developers are, at heart, those who see pastures and the people who live on them as objectified resources — natural and human — to be developed, and they are usually national planners and macroeconomists. Those who favour “development for pastoralists” are more often anthropologists who see existing groups of people as the raison d’être of development work. I want here to make explicit and to heighten the tension between these two orientations, to try to exaggerate the differences between those who favour each. I do so in the hope that refutations of these characterizations will come from every direction, will defend the common ground between the camps, and will therefore lead to solidarity. After elaborating my sketches, I will suggest some of the substantive issues on which holders of the two viewpoints differ fundamentally. My “data” came from my work on one side of the street, that is in six countries of West Africa and in Somalia with the planners and implementers of livestock programs and projects, and on the other side of the street from my own professional bias as an anthropologist.

aims, theories, and strategies of pastoral development: two modes

The development of pastoralism has been discussed in two modes, which for simplicity here are called respectively a “resource-based” and a “people-based” perspective.

the resource-based view

The “resource-based” perspective, fundamentally that of many planners and economists, takes as its point of departure the contemporary national state, and its aim is the construction of the state. Pastoral resources are national resources, to be developed in relationship to alternative investment possibilities and in accordance with national perceptions of utility. They are national resources both in the legal sense that most countries vest in the state all title to communal lands outside village boundaries and in
the sense that the state structure counts them in its inventory among all other resources. That they are to be developed relative to alternative investments is graphically exemplified from my experience of the planning for development of the Gambia River basin. The basin is shared by the states of Senegal and Gambia, who mount a joint international commission for its development. The whole country of Gambia is the central corridor of the basin, whereas the fringes of the basin Senegal owns are but a fragment of the national territory. Thus, plans for livestock (and, indeed, all other) development in the basin are urgent and central to Gambia, whereas they are relatively remote and marginal to Senegal. The resulting imbalances of investment priority harry the work of their mutual High Commission. As a corollary, pastoralists who are relatives and neighbours, who live in identical communities, but who are on opposite sides of the border, are likely to face very different futures. National, not local, perceptions of the utility of development dominate planning both concretely, because the prime movers of development serve their own class needs above all others, and ideologically, because current ideas of the developed state require each segment to contribute to the whole, not stand apart from it.

This worldview of national and international planners is unremarkable. Development of pastoral areas proceeds in relation to other national priorities, to the array of demands on the state, and (to some extent) to the vagaries of international investment fashions.

The larger theory on which development in this mode is based can be induced from development practice. Beyond government labels and the rhetoric of highly disparate national plans, development nearly everywhere emanates from several debatable propositions. The first of these is that development is a process at the aggregate, national level, that whatever may be defined by national leaders as the public benefit overrides sectional or sectoral interests. Because those who define the public good also hold crucial power, this belief justifies their working their will upon society and their decrying as antistate any seriously competing visions of the future (such as those some of the pastoralists might hold). Second, development is believed to be a manipulable, technocratic, workaday process, however hard each step may be. Development, in this view, is the work of the state and is to be directed by those who work for the state. If people outside the state machinery have energies at all, they are but potential and must be released or harnessed for development. Still, development as an everyday occupation has its hazards. It is disrupted at every turn by natural and human events, but because the legacy of 19th-century concepts of popular will is that the contemporary state is justified by its development efforts, the state itself, not just the regime in power, often teeters in the dialectic of development plan and accomplishment. Repetitive effort, even if not cumulative, demonstrates that the state is at least trying.

At the operational level, development is less pursued than is change. Technicians in development work often describe themselves as change agents. They make little distinction between — or in fact see as identical — the concepts of development and change. They are impatient with the theoretician's reflective question: But is it really development? Instead, development is an applied weberianism: it consists of the integration of a given population into national participation by means of the elaboration of bureaucratic mechanisms of control, and it seeks the specialization of the
economic function of the group (for example, meat production) within the national organism. The central elements — of incorporation, bureaucracy, control, and specialization — all strike at least some anthropologists as the antithesis of the demands of pastoral nomadic economy and society. Yet, government officials are matter-of-fact about the centrality of such elements to any kind of development, including pastoral development.

The conceptualization leads development practitioners to premise their work on optimizing the profitability to the nation of differing land types. Land-use inventories, satellite sensing and analysis, and land-type regulatory schemes such as those in Botswana and Kenya are examples of development techniques devoted to the specialization of land use with little attention given to social data. The extensive Société d'études pour le développement économique et social (SEDES) plan to stratify the West African Sahel into specialized zones for the calving, feeding, and finishing of cattle demonstrates the extent to which technical evaluations of land capability have been used to work toward economic optimization with little regard for social patterns. The same economic logic underlies irrigation schemes that have supplanted crucial riverine grazing lands, as in the Senegal River valley and in the Sudan, and dry-land agriculture that has progressively invaded extensive range-lands, as in Niger and Nigeria.

These theoretical underpinnings of development practice portend an obvious future for the marginal lands not now conceivably useful for any form of crop agriculture. If such lands are only effectively harvested by foraging animals, then the logic of development is to put such lands to the service of the nation for meat production. As incomes in the nation go up, the demand for meat will demonstrably rise. Increased offtake from the range will therefore be necessary. The increases will require outside technological intervention and dramatic social intervention, because current range practice (it is thought) has an immobile if fluctuating level of production.

In summary, growth, specialization, control, and modernization are the motives of national development of which pastoral development forms but a small part. Once one accepts that development is a result of these forces — and all the elements of the paradigm are simply hypotheses that happen to have great force at this moment — then the tactics available to achieve such goals become equally patent. Walter Goldschmidt has succinctly categorized development efforts as involving environmental alteration, livestock improvement, direct change of the social institutions and values of the pastoralists, and new economic infrastructure for livestock production and marketing. Each and all of these methods are judged in cost–benefit terms such as the higher sale weights to be achieved by better animal health or quicker transport. The cash income possible from meat has thus become perhaps the central value ascribed in development schemes to pastoral production. That this is a distortion of pastoralists' goals has been repeatedly demonstrated, even in those societies that have extensive market production as one aim of their family enterprise.

I have called Goldschmidt’s list of livestock interventions the tactics of development because they are only the elements of the wider development strategy of governments. The strategy for achieving national resource development is nearly always the project. The project is the embodiment of the overall policy for the penetration of the state into its internationally sanctioned domain. As the means toward expansion of the effectiveness of
the state, it is no wonder that the strategy of development by projects proceeds by quasimilitary airs: the population to be involved is the "target" population; the project is often entitled "operation" such-and-such; each season may involve a "campaign." The disciplinary aspect of development is revealed in such terms as the French encadreur for the extension agent and, more importantly, in the support of state policy to institutions that would control prices, cattle movements, range use, and other vital aspects of people's lives.

In short, the intertwining of political and economic aspects of development projects is explicit and total. Attempts to account for their success or failure in economic terms alone often miss this crucial point. Economic failure is often matched, in fact, by political "success": a local population is subordinated and incorporated; bureaucratic control is extended; and the incentives to specialization within national production strategies are forcefully brought home to the target population (some good examples of these "successful" efforts are the Maasai group ranching schemes of Kenya — Galaty 1980; Doherty 1979).

I believe the participant–observer's report that I have given is neither cynical nor distorted. Recognition of the straightforwardly political aspect of development helps to account for three recurrent features of development schemes that academics often find inscrutable: first, that identical schemes are tried time and again despite recurrent evidence of failure in economic terms; second, that the pastoralists (or other poor populations) are blamed for their own problems (the nomad is the father of the desert, one such myth goes) and must therefore be "rehabilitated"; and third, that projects are pursued even when their deleterious effects on existing social and subsistence economic institutions have been demonstrated. Without extending this line further, perhaps I can now turn to the alternative position on pastoralist development that anthropologists have more commonly adopted.

the people-based view

The frequent focus in the anthropological (cultural geographical, rural sociological, etc.) view of development is the single "people," the subunit of a population with a common language and culture, or the microregion in the social and physical geography. The development needs are a reflection of this set of people's problems. The problems — declining food supplies, lagging health or educational opportunities, subjection to increasing depredation or deprivation, exclusion from prior rights or resources, recurrent natural disaster, or inaccessibility to opportunities available elsewhere — have sources that are clearly politically as well as economically derived. However, except in a few extreme cases, they are seen to be unfortunate aspects of sociocultural and production systems that work successfully most of the time for most of the people. Development, in this view, consists of solving people's perceived problems and enabling them to achieve their own goals more rapidly and with less constraint than previously (or recently) has been the case. Not even all constraints are believed to be candidates for alleviation; some may be relieved only with negative results on other aspects of the local system.

This anthropological worldview is based on a theoretical perspective that makes social or cultural or production systems far more important than
individuals. The varieties of the theory are manifold and include at least: the structural-functionalists who see integrated social life as normal and unique and see much change as discordant and dysfunctional; the cultural ecologists, who see populations as constantly adapting to sociocultural and physicobiological circumstances; and the historical materialists who see changes in relationships of power among interacting groups as the key to understanding local situations. Whatever the variety, however, all agree that men and women make themselves, that is to say, that people constantly recreate and reproduce their social arrangements (even if they just happen to conform to systemic demands in their choice-making), and are therefore the best judges of what works for them. Development thus represents the choices made by them to alter the patterns they have practiced toward patterns they see as having higher payoffs. Indeed, most anthropologists would agree that most development is undertaken by the people themselves with no direction whatsoever by outside agencies. In an extreme view only those innovations are successful that fit local conceptions of valuable ways in which to move, so development projects are highly likely to fail unless they clearly identify with local aspirations for change.

This perspective also has its problems, of course. It tends to underestimate internal variability in systems, especially at the level of differential power and incentives for individuals to innovate; by focusing on cultural or production systems, it overunifies "the character of pastoralists" (Goldschmidt 1980:15) or their values or their production modes. Similarly, as Dyson-Hudson and Dyson-Hudson (1980) point out, the anthropological approach (especially but not only in Africa) has tended to overemphasize the isolation of pastoral systems from the wider societies of which they usually form part. Finally, it has minimized the effects of recent change, stressing continuity and durability instead, and has often underrated the impact of dynamic individuals and the potential for rapid alterations within systems as new conditions present themselves. Although none of these disabilities is inherent in the perspective, the frequency of their occurrence gives rise to the charges so often — and correctly — leveled against anthropologists of being romantically engaged with the past, blind to political imperatives that emanate from outside local systems, or rejecting even the reasonable possibility that change is for the better in the long run if not in the short.

With the local perspective described, the development strategy itself is apparent. It concentrates on local systems, on identifying the problems that may be recognized (consciously or not) by the pastoralists, and on assisting them to find solutions that are capable of realization with least cost to the existing social order. Such a strategy may sound like the one currently popular among agents of development, the strategy of integrated rural development (IRD). IRD takes as a field of action some limited terrain and seeks to manage diverse interventions in the way most sensitive to the interactions in the given situation. But one must distinguish the IRD that merely seeks a coordinated intervention in local society by a multiplicity of ministries from the IRD of anthropologists and others that seeks to prod development from within and to respond sensitively to basic human needs beyond calories and shelter.

Perhaps my anthropological colleagues will get as angry as the economists and planners if I assert that their locally oriented view of development has been as much a failure as the government-inspired approach. The failure is different; rather than squandering hundreds of
millions of dollars on failed projects, anthropologists have squandered millions of words on the analysis of failure and on the rectification of the factual basis for development, without having had any more positive impact upon rural society than have governments and development agencies. Walter Goldschmidt bespeaks the frustration of many academics when he laments that the repetition of proven errors by governments "makes one wonder why writing was ever invented." But to blame change agents for not having paid attention to academics may be no sounder than to blame pastoralists for not having heeded government agencies. It may now be time, and this conference may be among the first places, when anthropologists try to assess the full degree to which answers exist to the problems posed in whichever development orientation one holds.

beyond name-calling

Perhaps there is general understanding of the positions I have belaboured. Certainly the stances of the two major nonpastoralist groups concerned with the fate of pastoralists (when will pastoralists have their own conferences?) are well known, if not the full contexts from which the stances derive. I am sure that it is even known — though not often acknowledged publicly — that outside each other's earshot the anthropologists say that development personnel are ostriches but with less recall and development people shrug off anthropologists as being at best romantic, at worst, either crazy or totally irrelevant to development, to the futures of the very people among whom they have worked so long. It concerns me deeply, as an anthropologist who has worked both sides of the street, that development-oriented people in other disciplines so profoundly resent the anthropologists' deprecation of their efforts as professionals. It equally grieves me that development planners regularly use a single piece of bad anthropological advice to justify not paying any attention to anthropology. Unless the two groups get beyond the hostility and suspicion that are sometimes masked by joking they may still, after dozens of sessions like the current conference, learn little from one another.

The questions that they must address together concern the common ground between the strongly contradictory points of view from which they begin. That the two groups have come together at all, either here or in consultancy and academic settings, is already a sign of concession and progress. But my experience has been that the encounters so far have been exploratory, even groping — for example, the entry of economists in development settings where only anthropologists have set foot before. As a student of mine was told when he went to northern Cameroon and met the team leader of a major livestock development project, "They've sent you to me, but I have never worked with an anthropologist before. You will have to tell me what you can do for me."

Among the many issues of fundamental importance, there are five questions for which I think neither the developmentalists nor the anthropologists have convincing answers.

First, where should investments in livestock development go? Hans Jahnke (personal communication), program economist at the International Livestock Centre for Africa in Addis Ababa, has made an extensive review of livestock development investment in Africa from the developmentalist point
of view. He, like Walter Goldschmidt, recognizes the general failure of such efforts, but the lesson he derives is simply that perhaps investment in arid and semi-arid areas should cease! Instead, investments in mixed farming in more humid areas, whatever technical problems must be faced, may have higher payoffs to meat and dairy supplies for expanding populations than will ever be possible from the more sparsely settled nomadic areas. Certainly governments on the west coast of Africa, traditionally dependent upon Sahelian supplies of red meat, are bent on ensuring their sources by developing internal programs within more humid areas. To the extent that such programs succeed, will they not only supply beef to the nation but also undercut pastoral nomadic production and make pastoralists still more marginal and farther from a share of national growth? Some anthropologists I know might welcome "their" pastoralists' being left alone and thus might agree to the stopping of programs for pastoralists. Most, however, are curiously mute about overall investment strategies, claiming that such issues lie beyond the limited geography of their science. To disclaim expertise, though, is to abandon judgment to those with less expertise about the people. Can or should the half-blind lead the blind?

There are at least two partial responses to the first question. One is based on human rights or equity: pastoralists have a right to participate in the nation, have a claim on its and the world's resources, must not be shoved—like the San of southern Africa—first onto the desert margins and then even off those. Put another way, the equity argument raises the spectre of dispossessed pastoral (and agricultural) peasants' scrounging food in the cities and argues that a modern version of Britain's 18th-century enclosure acts can only lead to unbearable misery. The second response is based on long-term economics. It argues (Konczacki 1978) that all croplands will sooner or later become too valuable to use for meat production, that grain or even crop residue feeding will cease, and that only nonarable rangelands will be economically viable meat-producing zones. Given that long-term eventuality, it makes sense to invest in the rangelands now and in those people, the pastoralists, who already are masters of the range. Often, of course, what makes sense from a long-term view is utterly disregarded by short-term developers, but I think it is around these two responses that further discussion must ensue.

A second fundamental question is what are the effects of change on class in pastoral societies. A closely related question is what are the effects on class of removal of people from the range.

Bourgeot (in his paper for this meeting) gives an excellent version of the anthropological vision of pastoral development when he comments on the growth of a "livestock bourgeoisie" in nomadic areas undergoing development. He says, "any development effort conscious of this reality and contributing to it provides the engine for a machine eliminating nomadic societies." He equally warns against a utopian vision of the past and concludes that it is necessary to create conditions for the resurgence of the pastoralists' innate capacities for responding to the challenges that face them. As well, he calls for technical options that permit an adaptive evolution and mutual support between pastoral societies and the nation-states. Can one really envision nation-states within which social differentiation proceeds—as it is doing—everywhere but in the pastoral areas? Will the pastoral societies really disappear or at least cease to hold our interest, if the running dogs of world capitalism also run most of the animals of world pastoralism?
On the related issue of clearing “surplus” pastoralists from the range, the influential economists Ruthenberg and Jahnke (1976) have argued that the rangelands in East Africa must eventually support fewer people but that their increased incomes must be taxed to help provide for off-range (and off-farm) employment for those displaced. The intertwined problems of stratification and population redistribution remain, and further discussion should help identify areas where anthropologists and other development strategists can collaborate to sketch the parameters of the actual societies evolving. The real-world business of influencing the future shape of societies rather than studying their current or prior shapes is certainly not beyond anthropological sensibilities, even if it is not the common fare of the discipline. Wary of prescribing, anthropologists must do so more forcefully than they have hitherto — precisely because others are already doing it on a massive scale.

A third fundamental question is whether technologies or techniques now exist (whatever their economic feasibility) for positively altering the lives of pastoralists. Certainly a great many careless technologies for pastoral transformation have been tried, including the granting of uncontrolled access to wells. I think Goldschmidt misses the mark, at least for the Sahel, in his assertion that the wells themselves have always been wrong because, in my opinion, what has been wrong is the lack of ownership ascription or access control. Ranching and grazing schemes precipitate the privatization of resources; indiscriminate animal and human health improvements, price controls, and improved breeds that cannot be pastured properly are all examples of careless technologies. There is much less known of technologies or techniques that have succeeded or might succeed in the pastoral milieu, if success be defined both by developers and by anthropologists. This is not just a matter of a commitment to starting where the people are but a commitment to amassing hard evidence for technical change. More discussion is essential both on items now being field-tested and on ideas that have not yet reached the developers’ schemes.

Fourth is the question of how much autonomy, self-direction, and self-control that pastoral societies must have. Bourgeot speaks, as have Horowitz (1978) and I (1977), of releasing pastoralists’ own energies for decision-making and of using pastoralists themselves to implement development schemes. Yet, in many countries the officials implementing programs of change for nomads are themselves not from nomadic origins, and some governments give jobs — such as mining work — in pastoral areas to more favoured groups. As well, most governments claim ownership of rangelands with little legal recognition of indigenous tenure. As a parallel of land-claims issues among Amerindian peoples, there is little agreement on the extent that pastoralists own, or have some claim on, all the resources of their historical homelands. To what extent can greater security of land tenure, subsoil resource claims, or development program self-management be effected in pastoral areas? Again anthropologists differ in their responses.

Fifth, is the question of what is seen as the end result of pastoral development. Is it simply to give self-control to pastoralists and let them decide on their future; if so, what are the tools of self-control, and how can they be “sold” to governments? Is it to ensure that pastoralism continues or, conversely, to ease the transition from pastoralism, for example by raising incomes and encouraging their use in financing children in the educational route from subsistence? Is it to diversify local economies and opportunities or
to develop only livestock? What is at stake here is not the vision of pastoralism as a way of life but the futures of the people who happen now to be dependent upon pastoralism.

**discussion**

*Marx:* The separation between government and pastoralists is artificial. Both are part of one social system. If the paper had started from this point, it would not have discovered such extreme contradictions. The same remark applies to the dichotomy of anthropologists and developmentalists.

*Aronson:* Perhaps the government—people dichotomy is limited to West Africa and Somalia. We may hear more about the reality of these dichotomies from other speakers later.

*Willby:* Attitudes of pastoralists and developers have recently been influenced by the pressures of population — an increasing number of pastoralists competing for a living from a decreasing land resource. As a result, technical views and priorities tend to predominate in economics.

*Aronson:* I thought I recognized internally and externally generated problems. I do not suggest problems are not real. The question is whether our responses are careful and far-seeing or careless — as so many have been.

*Hopcraft:* Economics is the study of production, distribution, and decision-making systems. To suggest it is a preoccupation with imposing the evil nation-state on hapless and innocent pastoralists is ignorant, na"ive, irritating, and a hindrance to interdisciplinary understanding. Anthropologists who try to preserve the isolation of their pet cultures and economies are doing the people no service. Relations with other communities can substantially raise well-being in pastoral economies, and pastoralists recognize this better than some anthropologists.

*Aronson:* I do not object to trade. But, for pastoralists, should meat production be primary? Nationwide trade is important, but it is invariably dominated by large operators and high-level sociopolitical mechanisms that are not always to the benefit of the primary producer.

*Salzman:* We cannot ignore the political element in government priorities and planning. The government position is “You can’t make an omelet without breaking eggs.” That is, you cannot build a country without causing problems for some sectors and some people. But people are not eggs and must not be dealt with so cavalierly. And then there is the major political question: Who gets to eat the omelet? Who benefits from these plans and their consequences? Does it end up that government functionaries are working in the interest of government functionaries at the expense of pastoralists and the rest?

*Bourgeot:* Aronson’s experience is quite interesting, because, as he stated, he has stood on the side of the developers and, in his training, on the side of the anthropologists. The conjoining of these two experiences permits him to confront two different realities, which he is able to synthesize because he recognizes — it appears — the necessity of reactivating the dynamism of these societies who rely for their subsistence on their specific pastoral expertise. A further remark: I do not differ from Aronson until he proposes a
distinction between the state and the regime in power. The latter always corresponds to the nature of the class within the state that organizes the political domain. The regime in power does nothing but reflect the interests and the politics of the class in power.
an anthropological approach to economic development

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The time is long overdue for a new approach to economic development. The signal failure of existing programs and the frequent harm they have brought about are enough to warrant such a statement. The dismal record offers detailed evidence that technical aid for the pastoral peoples of Africa is a hodgepodge program that has done nothing for the people themselves, the nations in which they dwell, or land from which their sustenance comes. These negative results are manifested whether the programs have been initiated by colonial governments, international agencies, or the new nations (Goldschmidt p. 101).

It is the tendency for aid officers to blame the ignorance, recalcitrance, and irrationality of the target populations, but this, in psychological parlance, is mere projection. The record of pastoral peoples in Africa demonstrates that under aboriginal conditions they have been astute in their management, imaginative in their organization, and adaptive to changing circumstances in their procedures. The reasons for the failure of aid programs lie in the manner in which they are formulated, in the approach of the technical experts - the new missionaries. They come to their task with the zeal of the twice-born - certain of their knowledge, convinced of their righteousness, and unwilling to learn either from the people or from their own mistakes. In addition, the experts have followed their own calling, trying to solve the technical problems within their expertise - whether range management, hydrography, or animal husbandry - without taking cognizance of the secondary consequences of the solutions they promulgate.

Programs for economic development and land-use management for pastoral peoples of sub-Saharan Africa over the past half century can be divided into four categories: those aimed at altering the environment (digging wells or boreholes, brush clearance for tsetse fly control, burning control, stock reduction, and block-system grazing); efforts to improve animal quality (disease control, breeding, and culling); efforts to change the pastoralists' traditional patterns (changing their attitudes and social practices, settlement schemes, and the establishment of ranches); and economic programs (improved facilities such as abattoirs, transport, processing plants, feed lots, marketing arrangements, and credit arrangements). None of these efforts have succeeded in either improving the lot of the pastoralists, increasing their economic productivity, or staying the process of land deterioration. When individual efforts have been successful, as notably was the case with inoculation programs, they have merely exacerbated the situation by
increasing the livestock population that, in turn, overgrazes the land and reduces its carrying capacity.

An examination of these programs reveals that:

- They take no cognizance of the native population's knowledge and understanding of the local conditions and its solutions to practical problems of herd management;
- They are unconcerned with, if not actually unaware of, the values and goals that motivate pastoralists;
- They take no cognizance of the collaboration inherent in the local social system, treating social organization as a kind of anthropologists' figment rather than as a structure for action;
- They are unaware of the integrated and interrelated character of behaviour, of the inevitable fact that change in one aspect of behaviour has repercussions upon every other and the secondary consequences of beneficial programs can, therefore, be destructive; and
- They do not learn from their mistakes. Programs that have been roundly condemned by planners themselves will be blindly introduced elsewhere because there has been no systematic evaluation of what has gone before, and anthropologists' criticisms of their efforts are brushed aside as merely reflecting the vagaries of the natives.

My reference to missionaries is not merely a figure of speech, though the development planners would save humans' bodies, not their souls. In all fairness to the real missionaries, however, I think they have learned better than development agents to work within the native context.

What is needed in development planning is what may be called an anthropological approach. An anthropological approach starts with a recognition of the character, values, needs, and organization as they exist in a population and builds its development plans on this base. Before I proceed, it is necessary to say what it is not. It is not opposed to change; it does not seek to retain native society in some pristine, imaginary pre-Europeanized condition; it does not want to create native reserves. Anthropologists have, not without reason, been accused of such attitudes. These notions are a meaningless, escapist idyll, and no longer are part of anthropological attitudes, and certainly should not be. Nor does it take for granted that everything in the local culture is good and proper, that the customs of a people are inevitably and ultimately right. Even under pre-European conditions this was not the case, although the very existence of nations, markets, and new technologies often renders existing institutions obsolete. Nor does it assert that local cultures are homogeneous, that the people live in some idyllic harmony. Internal conflict and social differentiation are normal to tribal societies, as they are to all societies.

Malfunction and conflict aside, tribal peoples live in a world of traditional belief, meaning, and structure that gives purpose to their lives; to disregard these is to undermine the basis on which collaboration is operative. Therefore, the anthropological approach means that existing culture be taken as a point of departure, that starting where the people are is essential, that the change be made to constitute an organic growth, that new institutions be allowed to evolve and adapt rather than be forced upon the people.
This approach means that any planning be location-specific, that generic plans with respect to development be made adaptive to local conditions. As anthropologists have come to know better the local institutions of East African pastoral people, they have recognized two things: the pastoralists share a fundamentally similar set of attitudes and institutions, although at the same time they vary significantly in cultural details. It is, therefore, feasible to work out generic programs for their development, but these should be made adaptable to local needs and requirements. No land-use specialist would set forth a plan without concern with the local character of soils, geomorphology, and climate. Why should not a similar concern with the local morphology of the human community be recognized as standard practice? The reason, I fear, is that the social topography is viewed as inconsequential or irrelevant.

The plans of diverse specialists need to be developed in coordination, livestock improvement, water resource development, range management, marketing programs, credit unions, etc., to be formulated in concert so that each can contribute to the whole, rather than canceling each other.

For such a program to work, the task of coordination and the role of decision-maker must be placed in the hands of specialists who understand the human scene, not in those whose specialty lies in the hardware. This mandate applies on the national, the regional, and the local levels.

I do not say that control be placed in the hands of anthropologists. I am not concerned with academic labels and unionized expertise. I am aware that anthropologists are by no means the only persons who can play such a role and that they are often lacking in other talents requisite to it. What I am calling for, rather, is that the personnel in this crucial role bring to it an anthropological outlook. What I am asking for is that this anthropological perspective not be limited to the role of post-hoc critic and I-told-you-so gadfly but be brought centre stage in every phase of economic development.

Thus far I have had to be highly programmatic, dealing in generalities. Now I will give a few examples of what I mean in actions that have been, or might be, taken with respect to African tribal pastoralists.

The first of these I shall borrow from my colleague John Galaty (1980). His work and that of others examining the development of ranching schemes among the Maasai (Baldus 1977; Hedlund 1971) have pointed out that the ranch unit that the government selected conformed to no existing Maasai social entity. The Maasai were concerned about this, but their advice and that of the anthropologists were simply disregarded. Galaty has shown some of the costs of the disregard for native social units: warfare, bloodshed, and circumvention. He does not mention another cost, but I doubt not that he recognizes it — loss (or, perhaps better, further deterioration) of confidence and respect for authority and the government it represents. As I have already indicated, structural units are entities of established collaboration, they are divided by isoclines of mutual trust. Trust is a valuable commodity; it should be husbanded and nurtured and not wantonly destroyed.

A second instance may be drawn from further south in which disregard for native knowledge, rather than social structure, was responsible for the failure. Cruz de Carvalho (1971) sought to avoid the fencing of cattle ranches in Angola. The pastoral people there were insistent in their expression that such delimitation of territory available would not allow the flexibility in the strategy of land use that was requisite to its effective exploitation. They had acquired over time a detailed knowledge of microvariation in their grassland and the need for access to various kinds of pasture under changing climatic...
conditions. According to Cruz de Carvalho, the new ranchers soon had to break down these fences and return to the traditional patterns of livestock movement.

Anthropologists themselves have given inadequate attention to the dynamic effect on the human ecology of the national context in which tribal peoples live. Raids, warfare, and other disasters had the effect of maintaining balance of population and animals in prenational conditions. These are not methods to be recommended, and in large measure they have been stopped. But the withdrawal of traditional forms of human and animal population control and distribution has contributed to the pressure on the land. For this reason, it is essential that new institutions be substituted.

The obvious solution lies in the establishment of regular marketing systems. National governments should want pastoral peoples to market excess animals, thereby both reducing the pressure on scarce grass and establishing a flow of meat into the urban centres where it is so desperately needed. Hence, it is surprising that the evidence indicates the consistent failure to establish marketing facilities or to create market incentives. Government-sponsored purchase programs have failed to meet market prices for animal products in the several instances for which data are available (Federation of Rhodesia and Nyasaland 1956; Jacobs 1973; Dyson-Hudson and Dyson-Hudson 1970; Baker 1967; Bernard 1972; East African Royal Commission 1955; Mackenzie 1972). It is generally held that pastoralists are unwilling to sell their animals, but anthropologists and others intimate with pastoralists’ lives regularly report that this is simply not the case, that all pastoralists regularly sell animals.

To induce pastoralists to market their animals, one must create conditions that make such action meaningful, not only establishing good market conditions but creating incentives for the pastoralists. To do the latter, one must understand the pastoralists’ perceptions of and uses for their animals. Their reluctance to sell rests on a principle that is dear to New Englanders: don’t consume capital. To say that cattle express prestige and that numbers are therefore important is true, but it makes trivial the much deeper consideration of animals as the essential coin of social relationships. One must remember that livestock, particularly cattle, are not merely a food resource; they are also capital essential to all kinds of negotiations involving influence and alliance; they are not merely savings; they are the only form of investment available to tribal pastoralists.

It was these and other considerations that led me to propose the formation of livestock banks for pastoral people as an essential ingredient to any development program (Goldschmidt 1975b). That proposal illustrates quite explicitly how to think in terms of native values and native interests. The plan is specifically relevant to the Sebei of Uganda, whose culture I have studied in detail (Goldschmidt 1967, 1969, 1976); I am certain that it would work among these people provided only that they had a government in which they had trust, and I believe with minor adaptations it would work among other pastoralist groups in Africa.

The Sebei share interest in the accumulation of cattle, characteristic of pastoralists, and these animals are central to all social negotiations, creating patterns of alliance, dependency, support, and obligations in elaborate networks, both within kin groups and between unrelated individuals. Individuals, therefore, endeavour to build and maintain a herd against the
many hazards, both natural and human, that the cattle must face. A herd is the monument and obituary of its owners, and a close reading of the animals in the kraal is a record of the major social interactions of a herder's life (Goldschmidt 1969). This does not mean that the Sebei are unwilling either to eat or to sell their cattle, which they regularly do. It happens that the Sebei calculate lineages of cattle, matrilines that (like kinship everywhere) express social rather than biologic continuity. A Sebei wants to retain at least one representative of important sources of such cattle lineages, e.g., one from each aunt's and sister's and daughter's bride payment. The continuation may be in the form of a transaction; for example in the sale of a steer and purchase of a heifer with the proceeds; she and her offspring are the continuation. The Sebei has a sentimental attachment to the lineage of cattle as expressing social continuities but not to particular animals — save the "bull of the herd." It is also the case that in bride payments, frequently a standard sum (it was 100 shillings in the 1950s and 1960s) could regularly be substituted for a bullock or heifer. Finally, the Sebei recognize and accommodate deferred payment. Cattle owners engage in stock exchanges for which payment may be delayed for a generation or more.

Now, if it were possible to provide the Sebei with a certificate or token in exchange for their animals, one that had the constant value of the category of animal owned and that was redeemable in kind, they would readily make an exchange. They would be motivated to do so because it would reduce both risk and work load, but, at the same time, it would not impair the use of the "animals" in social negotiations. For this reason, I have proposed that there be established a livestock banking institution, which would supply these services.

Because the investment would not be subject to the vicissitudes of drought, raids, and predators, there would over time be a massive accumulation of capital. Though herd owners may reasonably assume some inflation in bride price, the changing situation will make them increasingly willing and able to use their capital for other purposes, such as higher education for children, the purchase of a lorry, and the like. As matters stand now, there is no way for the cattle owners to accumulate capital except on the hoof, and when they sell one animal and use the cash, they speak of having eaten it.

This is not the place to develop both the myriad lesser problems and their possible solutions, which I have discussed elsewhere, but I must place this proposed bank in the context of other necessary innovations. A moment's reflection makes it obvious that a bank would require a supportive system of holding pens and feed lots, disease-control operations, processing facilities, and, most particularly, marketing arrangements and facilities. But that is the purpose of the bank: to establish a regular flow of beef and other animal products into a market that is hungry for meat and at the same time to drain animals away from the grasslands. I have made projections of the ideal operation of such a bank and believe that it could reduce the wet-season cattle population by 20%, the dry-season cattle population by 40%, and could yield, after reasonable local consumption, a beef offtake of more than 15% (Goldschmidt 1975a). Disease control, breed improvement, and, above all, fattening and finishing of animals could vastly increase this yield.

My major purpose for reiterating this proposal is to demonstrate the basic principles of an anthropological approach to developmental problems: one must start with an understanding of the ongoing culture, most
particularly with an understanding of the values, the motivations, the interests of the people themselves, and their social institutions and collaborative arrangements. One can then begin to construct institutions that are relevant to these elements and are still adaptive to the development process. From the standpoint of the government, the marketing operations are central, but the key to this is the banking arrangement, for this harnesses the motives and purposes of the pastoralists.

What is needed in research? The research I think is most needed is an investigation of the social system and the cultural values of the tribal people. But I think that such essentially anthropological research must be different from the usual kind. For many years now, anthropologists have been busy talking to other anthropologists, endeavouring to build elegant or clever models in imitation of the replicable sciences rather than developing an increased awareness of the mundane character of ethnographic reality. Such literary tours de force inspired by one or another theoretical predilection — structural, psychologic, ecological, dialectic — are of help in tackling reality-based problems only by chance. Perhaps austerity in academic opportunities will bring a stop to such self-indulgence.

My first priority would be to endeavour to discover what the central social motives are in a society and how the individual operates everyday to actualize these ambitions — with particular reference to management of livestock. This should be done not only for the elderly and successful stockholders but for others in the society — women, young men, dissidents, and the like. It should pay particular attention to the use of stock in social relationships.

My second priority would be to examine the nature of the work force, with particular emphasis on the way it is organized in productive units and the distribution of benefits. This should cover all kinds of social collaboration, such as sharing of resources among kin and contractual obligations, whether kin-based or not.

My third area of concern would deal with the structure of the herds. I would start with the concept of the ideal structure and its rationale, then examine the actual structure, and seek to understand why the ideal differs from the real to discover the nature of the herdsmen’s compromise with reality.

Finally, I think it is time that researchers begin with carefully monitored experimentation — controlled experimentation, where possible. One regularly speaks of pilot programs but does not treat them as pilots by examining them to see what their effects are or tinkering with them to correct the defects. I am glad that the aircraft industry does not follow the policies that characterize the development industry in this regard!

If it were thought that a large group of pastoralists would be able to operate in the context of a livestock bank, a pilot bank should be introduced to a sector of a tribe and the effects of the operation monitored. Written into such a program should be a systematic post-hoc examination not merely of the economics of the operation but of the consequences for herd size, structure and distribution, alteration of social relationships, and the structure of social attitudes. The results should be compared with a control so that the effects of the program could be distinguished from generic changes.

An estimated 120 Mha of land in sub-Saharan Africa have been used for livestock, and these have been steadily deteriorating since the advent of colonial rule; some 15 million livestock-keeping people are living in poverty, with their lives (as well as their way of life) threatened while 100 million
Africans suffer a protein-poor diet, though untold millions of dollars have been spent in futile and ill-conceived development programs. I believe the knowledge and understanding are available to turn this situation around if an anthropological approach is adopted.

The conflict and tension between urban centres and pastoral peoples goes back to the very dawn of political centralization. It was my privilege to join the joint expedition to Terqa in Syria to help Professor Giorgio Buccellati, its leader, understand this relationship on the middle Euphrates in the 2nd and 3rd millennia, BC. In discussions at the site with him and professor Mario Liverani of the University of Rome, the latter discussed the efforts of the Mari Kingdom to pacify the nomadic groups by making individual land allotments to them — an early precursor to efforts currently being undertaken in Kenya. Liverani expressed the opinion that the downfall of the Mari Kingdom at the hands of Hamurrabi and its subsequent failure ever to reconstitute itself, was in no small measure a result of the disaffection this effort engendered among the pastoralists by which the kingdom was surrounded.

discussion

Goldschmidt: Perhaps it is fitting for me to serve as my own initial critic. First, I think it poor strategy to have called for an anthropological approach, in view of the pervasive, not totally unjustified, antipathy to the discipline, both in Third World countries and in development circles. I did so to dramatize an approach that is holistic and comprehensive and takes into account social and cultural factors, not to emphasize anthropology or to further sectarian interests. Second, and closely related, the dichotomy I am concerned with is not between anthropologists—sociologists and planners but between those who take a holistic approach and those who do not. This meeting has made me aware that many planners do take this approach, and some anthropologists do not.

Hopcraft: Having been interested in Professor Goldschmidt’s earlier review of why pastoral projects fail, I now see why he received from someone in the World Bank a curt reply to his specific proposals. Planners frequently feel enjoined by anthropologists to do that which pleases pastoralists and not that which does not. As I point out in my paper, pastoralists want more water and more disease control to assist their individually rational strategies of herd accumulation. But if projects of this type do not also control livestock numbers (and pastoralists do not like such control), they contribute to the destruction of the range. The anthropological approach appears to be in disarray.

At a more fundamental level, Professor Goldschmidt’s preoccupation with livestock to establish the family’s social position misses the prime function of livestock in these societies. Livestock are the means by which people live off what grows in arid areas. This economic dependence on them is the reason for their social significance.

In his trenchant and exhaustive review of why projects don’t work, he says without elaboration that what are needed are “appropriate social devices.” We are now exposed to the notion of a “livestock bank.” The fact that livestock in such a bank would compete for forage with all other animals
on the range he does not see as a problem. Who would manage the bank herds is not specified. Finally, a redeemable token is proposed. As I say in my paper, surplus livestock are a poor way to store wealth; they consume grazing that is more valuably fed to productive animals, and they decline in value as grazing becomes scarce. Redeemable tokens already exist and can later be traded for equivalent animals or other goods and services. They are called money. These tokens, although thought of as disruptive by some, are almost universally accepted as useful by pastoralists themselves.

Goldschmidt: With respect to my bank proposal, I have not presented it here in sufficient detail to warrant criticism or comment. The background paper circulated to the conference was the first of two parts, the second of which details the proposal and makes projections as to its effectiveness. I used it in the presentation merely as an example of how, in an anthropological approach, one can build on cultural values and motivations, to harness existing sentiments for development. For this reason, social and cultural factors should be incorporated into planning.

Second, I wish to comment on the economist’s ceteris paribus. In this intellectual process, an economist often throws the most important matters into the garbage bag of this cop-out phrase, and we anthropologists have to dig them out and show their significance. Ceteris paribus (all things being equal) is a convenient tool in research for controlling against variables. But for planning programs and policy, it is not merely ridiculous but positively dangerous. It is the source of repeated failures of development programs. The work of Dahl and Hjort, which the economists and planners so admire, tells us important things about what would happen if matters were purely economic or ecological, but it does not tell us what will happen, because pastoral peoples have many traditional social devices to overcome the problems Dahl and Hjort recognize.

Willby: It is a pity we have not heard anything this week on the goals of developing countries. We are aware of world concerns that developing countries are not making much progress toward self-sufficiency but, in some ways, are becoming more dependent, especially on rescue operations in which pastoralists largely figure.

I get the impression that anthropologists are mostly split into two groups. The larger group is of academics, based in universities, concerned mostly with research and training, with occasional forays into the field in support of their main activities; the smaller group comprises those caught up in development, who have become almost as committed to it as the technical developers. The latter should be helping to shape development priorities.

Referring to Professor Goldschmidt’s response to Hopcraft, I suggest some of his generalities were too wide — many veterinary schemes were unsuccessful, although they sought to keep more animals alive, and many pastoralists do have market opportunities and in fact have become very market-oriented. In fact, the Somalis may have gone too far: in some areas they have insufficient mature bulls to keep the cows pregnant because of the high value of bulls on the export market.

Horowitz: It is important to distinguish in the development field those involved in field operations (such as Wilby) and planners who live in such places as Washington (who were the real objects of Goldschmidt’s criticism). It would apparently be useful for Wilby to distinguish himself from those who
lack his first-hand knowledge of pastoral conditions. If project technicians want social scientists to share the responsibility for project failure or success, why are there so few social scientists in project managerial teams? An example is the Somalia Central Rangelands Project.

Ssenyonga: Anthropology has only recently taken development seriously. Professor Dalton was crusading in 1974 for the launching of "development anthropology," and he mourned the dearth of anthropologists involved in development. Here, in Kenya, the Ministry of Economic Planning has stated the need for sociocultural material, but so far we find little available from published material, even though so much anthropological work has been done. We need to reorient our ways of perceiving development problems. This in turn calls for new research skills, such as familiarity with statistics and methodology, particularly in those associated with training institutions. Anthropologists are still trying to understand the language of the economists. There are many requests for anthropological assistance from the Kenyan government, but anthropologists do not yet have the tools to respond adequately.

Conant: It may be we need an anthropological study of development agencies themselves; it is important that we understand their problems.
In this discussion of research priorities in pastoral studies, I shall often stray far beyond the conventional confines of my own discipline. Anthropologists' respect for formal boundaries is not unlike pastoralists' respect for international frontiers; one slips across the moment the guardian's back is turned. By research priorities, I mean those understandings required for the identification, design, implementation, and evaluation of livestock development projects. The challenge of the 1980s is to provide the scientific bases for development efforts that enhance rather than limit the productive capacity of pastoral herders and that increase rather than diminish the opportunities they have to make meaningful choices about the direction of their own lives. My focus is on the social and ecological organization of production. I will not consider many issues raised by anthropologists, folklorists, and historians, dealing with mythology, kinship, religious expression, body scarification, linguistics, or art.

expatriate and host country research

Before outlining the content of a research agenda for pastoral studies in the 1980s, I must acknowledge the necessity for a change in its modality. Like the vast bulk of scientific inquiry in the Third World societies, pastoral studies have been an almost exclusive preserve of northern expatriates working either on their own behalf or on behalf of foreign institutions. This is, unhappily, at least as true for the social as for the biological sciences. The entry of Third World scholars into this activity during the last decade is a most welcome and significant event, for it provides not only for enormously more intimate research made possible by total linguistic fluency but also for genuinely longitudinal studies from continued access to the field over many years. The holding of this conference in Nairobi and the active participation of scientists from African and Southwest Asian livestock-producing countries testifies to the recent shift from pastoral research as an expatriate monopoly to a host country participation.

The first priority, then, is to accelerate the transfer of pastoral studies from expatriate researchers to Third World institutions and scholars. This means that support for those institutions and persons should be incorporated into the project and program portfolios of the donor organizations and that a special effort should be made to expand host country capacities in the social
and ecological sciences. In rhetoric, this point is by now well established. But in practice it is more often honoured in the breach, host country scientists being underutilized while donors and contractors beat the bushes for even moderately qualified expatriates.

In almost all countries there is a need for institution building, personnel training at all levels of livestock programmed and projects, and reorientation of established curricula to reflect modern ecological approaches that show the interdependence of biologic and socioeconomic factors in pastoral systems. Most training programs today are continuous with those of colonial times, in which veterinary medicine is divorced from environmental issues, and range management ignores the social, political, cultural, and economic contexts within which the pastoral enterprise is carried out. New curricula would help rectify the arbitrary and artificial segmentation that leads to studies of animal health independent of nutrition. This is not to suggest the creation of a pastoral renaissance scholar, at once sociologist, agrostologist, and veterinarian, but rather of disciplinary professionals receptive to each others’ discoveries.

Whether or not these curricula are revised, it is essential that the numbers of host country professionals working in the pastoral arena and centrally involved in the identification, design, implementation, and evaluation of livestock development projects be increased. To achieve this expansion of personnel, the donors will have to provide additional support. In the first place, more funds should be made available for professional training. Second, host country institutions should more often be called upon to undertake development-related studies. Third, basic support should be accorded host country institutions and persons to support long-term research. And, finally, every major development intervention in the livestock sector should include a locally staffed research and monitoring unit.

The importance of these local units cannot be exaggerated. They provide a necessary empirical balance to the tendency of anthropologists and others to generalize from a few cases to an existential type — the pastoral nomad. The major shortcoming in the present understanding of pastoral production systems is not a lack of theory alone but the paucity of solid, in-depth, longitudinal, empirical studies. The number of developmentally useful descriptions and analyses of pastoral systems is very small. How many investigations can one name that actually have pursued pastoral activities for several years? Yet, in the absence of such information, projects are appraised that constrain the movements of herders, their access to range and water, and the numbers of animals they have. The current establishment of a few well-financed well-staffed internationally supported research and monitoring units sprinkled about the African continent will provide useful insights, but they are unlikely to generate badly needed project-specific information beyond their immediate zones of inquiry. At the 1979 Harpers Ferry workshop on pastoralism and African livestock development (Institute for Development Anthropology 1980), several African participants vented a concern that the formation of these international units, rather than encouraging the development of others, risked preempting the field. They called for the establishment of project-specific units where host country scientists working closely with pastoral populations could design local solutions to local problems and could fine tune the project to the social and ecological realities of the locale.
Locating research and monitoring units within project structures and staffing them with host country persons is a necessary but not sufficient step in making relevant their finds on project actions. To maximize the effectiveness of these units, the directors and senior staff should hold seats on the managerial committee of the project itself. Livestock development projects that have failed because of the lack of, or inadequate access to, relevant socioeconomic information are all too familiar, as are those in which the information was available within the project team and yet was ignored. The reasons are not difficult to understand. Donor agencies are in the business of designing and funding development actions, not often of implementing them. Once the project has been appraised, agreement with the host government reached, and a contractor selected, the donor's continuing concern is seeing that project funds are more-or-less properly expended. The donor becomes an auditor. The contractor has little vested interest in modifying actions and schedules or in changing the composition of the staff. If the project were poorly designed in the first place or if it were predicated on assumptions that prove less sound than originally thought, there is little incentive for the contractor to make appropriate adjustments and little involvement on the part of the donor to see that these adjustments are made. But a research and monitoring unit with institutional access to management could provide that flexibility. Although the sequence of research then development is preferable, one can appreciate the impatience shown by host governments and donor organizations with research that seems not to go anywhere. They want to get on with their business, and that business is development (or at least its design and funding). Research and monitoring units located within project structures allow, at least in principle, for there to be appropriate feedback between the studies and the implementation, to the ultimate benefit of the target population.

As there are scientific and ideological reasons to increase the participation of host country scientists in development research, there are also persuasive practical reasons. The availability of adequate cadres of host country professionals would go a long way toward mitigating many of the problems engendered by the constant search and replacement of expatriates whose tours of duty are too short to be effective or who are simply poorly prepared for the physical conditions under which they work. Range and livestock projects have been delayed for years primarily because of contractor inability to field appropriate staff. Almost complete turnovers of expatriate staff every year or so are common with a consequent loss to the project of acquired knowledge and momentum.

research priorities

In outlining the components of a research agenda for the 1980s, I am mindful of an emphasis on the social and ecological sciences and a slighting of animal science, veterinary medicine, and meteorology. That these latter are at least as important as the former goes without saying. Indeed, part of the difficulty with development attempts among pastoral peoples is the lack of a well-formulated technical package. This point is well-made by an AID (United States Agency for International Development 1980) Sahelien mission:
The livestock extension training program has produced field . . . [workers] . . . with more confidence, technical knowledge, social understanding and comprehension of the various elements of the livestock sector than have ever existed to date! Yet, this technology transfer system has revealed the dearth of pragmatic technology other than on animal health. The need for research — especially in nutrition — and the development of a more effective system for extension have been recognized now.

Nonetheless, I shall focus on those areas in which my social science colleagues seem best able to make a contribution.

By identifying specific items for special research attention, I do not mean to imply that they can be understood in isolation. Far from it. The elements form component parts of a system; each is relevant in the analysis of the others. A description of a pastoral production system must include the roles of women, children, and the aged; the conditions of land tenure and control over water; the demography of the herd; and so on. I have here simply focused on a few elements that have been less well-understood than is desirable for a well-founded development posture.

the political economy of pastoralism

Anthropologists have recently begun to rediscover what Kroeber knew 50 years ago: pastoralists form segments of larger political systems. But since Evans-Pritchard’s publication of *The Nuer* (1940), pastoral communities have most often been described as if they were self-contained and as if the tribe constituted the limit of political activity. For that reason, political behaviour among herders has most often been presented in the idiom of kinship, with the segmentary lineage system as somehow the form of social organization most appropriate to a mobile people for whom animal husbandry constitutes a major portion of their subsistence base. As Talal Asad notes (1978), the technical demands of transhumant herding have been elevated by many scholars into the causal basis for tribal social and political organization. The tendency for many pastoral groups not to include internal hierarchies with power concentrated among an elite segment has led to the false conclusion that herders live in unstratified or egalitarian societies. The treatment of pastoral groups as isolates also obscures their class position in society.

Some scholars, especially those whose fieldwork has been mainly in West Africa (Gallais 1972; Horowitz 1975), have been intrigued by economic, political, and social relationships between herders and farmers, particularly where these are ethnically segmented, and have tried to analyze both the arena and limits of their mutual exchanges or transactions. Despite their recognition of groups in a clearly regional framework, an advance over earlier ethnographic approaches, these analyses have treated nomadic-sedentary contacts as if they were international relations rather than interactions within the larger political system. It is curious that the term “peasant” has been so narrowly limited to sessile husbanders, so that nomads are seen as somehow not only technically but also economically and politically distinct. As Gudrun Dahl (1979:13) has recently written:

*Anthropology has not paid much attention up to now to the more subtle transformation of the material base of pastoral society which lies in its*
integration into the framework of a centralized state or to the long-term significance of even a limited involvement in paid jobs, marketing of produce or the creation of “reserve activities”... Pastoral studies in general and those of East Africa in particular, have tended to draw the analytic boundary of the pastoral society just outside the town gate, mentioning the small administrative centres or market towns as if they were not parts of the pastoral society but anomalous to it.

It is important that this traditional perspective be changed if studies are to facilitate development based on local interests and local participation. It is incumbent upon modern studies that they describe how surplus production — whether pastoral or agricultural — is allocated; how herders and farmers are taxed (or pay rent) in support of political and economic elites; how internally egalitarian or ranked societies become economically differentiated in social classes as they are incorporated into states. The development implications of this differentiation are patent; changes in access to land and water (i.e., range “management”) have different effects on different segments of the population. (This differential effect is implicitly noted in a just-issued report for the AID-funded Somalia Central Rangelands Development Project, which calls for range reserves “initially... policed by 20 guards.” One wonders whether police would be required if the benefits of participation were equitably distributed.) The political and economic subordination of herders and farmers — peasants — may be seen in the gross discrepancies between public revenues derived from the rural productive sector and public expenses devoted to it. Almost everywhere the former swamps the latter.

The first item on my research agenda, then, is the description and analysis of the political economy of pastoral nomadism. An excellent theoretical beginning has been made in Pastoral Production and Society (Equipe écologie et anthropologie des sociétés pastorales 1979) and in the contributions by André Bourgeot and Peter Rigby to this conference. What is now needed is empirical studies undertaken in the field.

pastoral demography

Since the seminal work of L.H. Brown (1971) on the demographic structures of pastoral cattle herds, a good deal of attention has been paid to the age and sex composition of herds in arid and semi-arid regions. The most ambitious and provocative of the current studies is Having Herds: Pastoral Herd Growth and Household Economy (Dahl and Hjort 1976). These studies have gone a long way in exploring the relationship between demographic structures and the consumptive needs of herders. It is a fruitful area for additional work, and the findings will have direct relevance for project design.

Whereas herd demography is beginning to be well-understood, herder demography remains far less convincingly examined. For example, Caldwell (1975) claims that the pastoral population of the Sahel, about 2.5 million or 10% of the total, is growing much more slowly than are Sahelian sedentary peoples. Is this true? Is it generally the case that pastoralists exhibit more modest population increases than do their farming neighbours? If it is true, are the constraints on growth to be found in comparatively reduced fertility or higher mortality or greater outmigration or in some combination of these? It is easy to speculate, but the basic data are not available. (This is hardly...
surprising for the population information about most rural areas in the Third World is suspect.)

Many fieldworkers have claimed that the unavailability of sufficient reserves of labour, is a prime constraint on the unrestricted expansion of herds. A number of anthropologists who have analyzed pastoral production systems in the Sudan note a constant upper limit for herd size that may be attributed to a limit on managerial control:

Humr recognize an optimum size for a grazing herd. A very large one becomes unwieldy: the tail end straggles out of sight through the trees; towards the end of the dry season, when grazing may be scarce, a large grazing herd is bad because the fast cattle tramp over the small patches of good grazing before the slower cattle arrive. Humr do not enumerate their cattle, but it appeared to me that about 150 head was the largest convenient size for a grazing herd that would suit all seasons (Cunnison 1966:68–69).

Those with large herds are forced to employ herders from other households that have labor to spare. The employment of such herders may lead to diminishing returns. A hired herder may not pay the same attention to the herds as the owner would. Also the fact that herders must be paid a certain amount at the end of the year reduces the ability of the owner of the herd to maintain sufficient replacement for the stock (Ahmed 1972:182).

The size of herds varies considerably. . . . For camels the maximum number in a single herd is about 150, and for sheep about 200. Goats, when they are not herded together with sheep, rarely exceed a couple of dozen to a flock (Asad 1964:45–68).

Writing of the Fulbe of the Doukoloma Forest region in Mali, John Grayzel (1975:25–27) reports:

. . . 100 head is the normal limit for a single grazing unit. During the day a sole herder can graze this number, though his task is generally made easier since calves being weaned are left to wander on their own in a different direction. For the transhumance itself, an assistant to share work is required, with whom 200 head can be managed. Occasionally seen herds of 400 are composites, with sufficient . . . [workers] . . . always present to split them for local grazing. . . . At approximately 100 head, an owner's problems qualitatively change. The guarding of . . . [the] . . . herd is now a full time job and usually too large to combine with others. This, added to those problems that increase directly with size, such as the searching for sufficient pastures, the difficulty of drawing well water, and the not to be minimized growing jealousy of other village[r]s, make it expedient for the owner to find a particular individual to be charged with caring and moving with the herd.

There would appear then to be considerable indication that there exist carrying capacities or stocking rates for labour, although I agree with Douglas Johnson (1978:2) that the evidence is hardly conclusive:

I also have reservations about the presumed importance of labor shortage in constraining the growth of herd sizes in pastoral economies. Certainly the case needs to be laid out in much greater detail and I would
very much like to see the numerous studies, supported by hard data, that support the contention.

Johnson's challenge needs to be taken up. The hypothesis to be tested is: a constraint on herd size is the diminishing returns from unimpeded increase, reflected in such costs as predation, theft, disease, inadequate watering, as the herd expands beyond the herder's capacity to allocate sufficient labour. The specific limit will be influenced by the amount of labour that can be mobilized for herding *cetens panbus* (controlling for terrain, the mix of animals herded, the quality and quantity of water, graze and browse, etc.).

If it is true that labour is a major constraint on herd size and if it is also true that the pastoral populations exhibit slow or static growth rates, it follows that pastoral herds are unlikely to expand very rapidly. It is a characteristic of pastoral herding over other forms of ruminant production that the ratio of animals to people is small. Without major changes in the technology of herding there is little reason to believe that the ratio will change markedly. I will not belabour this point but again the development implications are obvious.

**desertification and environmental degradation**

A substantial research effort of the 1980s should be devoted to a critical examination of the nature of environmental degradation in arid and semi-arid rangelands and the contribution to that degradation played by herders. So many documents, officials, and even scientists assert a pastoral responsibility for environmental degradation that the accusation has the status of a fundamental truth, so self-evident that marshaling evidence in its behalf is superfluous. For example, an agricultural economist writes:

> It is generally agreed that overstocking and the lack of managed grazing patterns in the Sahel are the most important causes of desertification in the Region and that desertification is a symptom of more fundamental problems or rapid population growth and the inability of individuals and communities to adopt known land management and conservation technologies. If current desertification trends cannot be reversed quickly, the countries of the region may permanently lose the capacity to feed themselves and the ability to support a growing population at even current subsistence levels. For these reasons, the mastering of the critical problems of overstocking is one of the keys to the medium- and long-term economic development of the Sahelian Region (Ferguson 1977:7).

This is a powerful accusation, the one most commonly leveled at African pastoralists since the 1968–74 drought made the planning community cognizant of environmental and ecological components of development. Because the thrust of the statement leads to programs that alter the traditional system of range use and lower the stocking rate — actions that are most likely to engender hostility and noncooperation on the part of the herders and that require coercive measures to ensure participation — it is important that it be examined carefully. The assumptions must be confronted with a demand for evidence. The accusation segmented into its component parts is that:
• The environment is being degraded, turned into desert;
• Desertification is caused by overgrazing; and
• Overgrazing is the result of (1) common access to pasture; (2) an unwillingness to limit stock numbers; and (3) lack of constraints on pastoral mobility. Peter Hopcraft in this volume argues similarly.

To Picardi (1974:55–57), a graduate student in chemical engineering who authored the pastoral systems volume in the Framework for Evaluating Long-Term Strategies for the Development of the Sahel-Sudan Region, secular degradation of the Sahel is an established fact.

For the past 50 years, explorers and range ecologists have reported a slow process of desertification in various areas of the Sudan . . . and North Africa . . . , attributable to various factors such as overgrazing or deforestation. Satellite photos of the region from 1972 to 1974 indicate the contrast between protected and non-protected rangeland, where the difference in vegetative cover made by a fence and some simple management policies is clearly visible. . . . These findings correspond with numerous accounts of “the Sahara creeping south” which begin to appear with every account of the drought-stricken area. Thus, one can gather that desertification existed for a long time.

Does the “thus” in the last sentence necessarily follow from the preceding material? The “numerous accounts” may well be instances of Gresham’s law applied to journalism: bad news drives out good. Every extended period of deficit rainfall is accompanied by warnings of the advancing desert. In 1935, Stebbing, forestry professor at Edinburgh, published The Encroaching Sahara, based on his travels the year before in Niger and Nigeria. He pointed to vast sterile sandy regions from the Niger River to Lake Chad as evidence of a southward migration of the desert. The Anglo-French mission in 1936–37 sent to examine the area concluded that Stebbing’s judgment was “pessimistic exaggeration” (Aubreville 1973:5 ), although they allowed that the land was being abused by deforestation, bush fires, and poor use of pasture.

What has been less well-publicized than the accusation that herders cause deserts is that in average and above average rainfall periods, such as during the 10–20 years that preceded the 1969 crisis, the desert may retreat and in some places its retreat is spectacular:

Charles Toupet was able to calculate that in Central Mauritania, between 1941–42 and 1951–52, the 100 mm isohyet moved 650 km toward the north. . . . “The sector thus demarcated between [the two isohyets], which can therefore alternatively be a desert from which the herdsmen flee, or a zone of pasture land attracting the herds, covers 340 000 km², or about 31.5 percent of the total area of Mauritania” . . . [T]he period from about 1945 to about 1965 corresponded to a generally wet cycle in the whole of the north sudanese and sahelian zone of West Africa, a wet cycle which is shown by a progression of crops, a projection of pasture land towards the north, and a recession of the Sahara (Bernus and Savonnet 1973:117).

Gresham’s law precludes treatises on deserts that fold their tents and creep away.
The identification of desertification itself is not simple. Range ecologists and agrostologists argue that to distinguish true desertification from temporary declines in production and temporary changes in species composition primarily attributable to several years of below average rainfall requires the accumulation of evidence over a long period. "Only over periods greater than a decade can desertification be clearly distinguished from the less lasting effects of drought" (Warren and Maizels 1977:1). Also:

Although the surveys and some of the other observations must undoubtedly be believed in their assessment of great damage, it is a more complex task to determine just how permanent this is. Where, as in the hilly Ethiopian Province of Tigre, there has been extensive and deep gullying, it cannot be doubted that recovery will be very slow indeed, but the sandy lands of the Sahel may recolonize and recover within a few years... (Warren and Maizels 1977:13).

Over time changes in the composition, mass, and quality of the vegetative cover may occur, but it is not inevitable that the changes are, in aggregate, negative. The veterinarian and agrostologist, Jean Valenza (1975:1), has documented the shifts that occurred in the Senegal Ferlo silvopastoral region in the 20 years since deep water points were introduced and concludes "les pâturages naturels de type sahélien-sahéliosudanien n'ont subi dans leur ensemble que peu de modifications en dehors de celles dûes à la pluviométrie."

According to Valenza, 20 years after the startup of a pastoral hydraulic program that expanded year after year, the natural range of the Senegalese silvopastoral zone and especially the western or "sandy" Ferlo pasture, seemed to have experienced only slight modifications in plant cover. The changes appeared more the result of variations in amount and distribution of rainfall than of the increased livestock numbers. Only within the several kilometres around permanent watering points were the changes noticeable (my translation). Thus, the only substantive changes in the pasture found after 20 years of intensive exploitation not caused by changes in precipitation were those in close proximity to the boreholes. Valenza rejects the very term "pastoral degradation," preferring to use the less value-loaded term "transformation," recognizing that the impact of the changes could be positive as well as negative. One need not share his optimism that the pasture transformations in association with deep wells have been beneficial to note that changes due to grazing rather than to precipitation are terribly difficult to identify. I have found only one study that establishes methods for distinguishing the pasture impacts of Sahelian drought per se from those associated with drought plus grazing (Breman and Cissé 1977; Breman et al. 1975). This again was limited to a comparison of the area in proximity to a single watering point on the Niono Ranch, Mali, with areas 4 km and more distinct.

The difficulty in making unequivocal judgments about the contribution of an activity to environmental degradation may be seen clearly in the case of fire. Many planners and officials would like to ban it altogether, and, indeed, governments have initiated stiff penalties for those who burn the bush (although official capacity to enforce the rule is very limited). Yet it is not clear that, on balance, the effects of such burning are detrimental to the range. According to the ecologists Warren and Maizels (1977: 50–51):
A gentle burn every year or two at the start of the dry season removes old stifling growth and allows new green shoots to come up in the following wet season. It releases nutrients held in the old litter that would otherwise only be slowly recycled, and it does not seriously damage the soil humus. Fire discourages scrub and therefore both encourages grass and keeps away pests and diseases such as tsetse and trypanosomiasis; indeed, where there has been a deliberate prevention of burning, there has been such serious encroachment that burning has been re-introduced.

The Malian team that has followed the transhumance of the Jafarabe Fulbe from the Niger Interior Delta to the Mauritanian Sahel and back states that, though fire caused a substantial decrease in dry-season biomass and the long-term environmental effects are not known, "the direct nutritional benefit for the herd is obvious...."

Without fire the cattle found little digestible food on the vast plains. It consisted mainly of *Vetiveria nigritana* when present as isolated standing green tussocks. These were the only tussocks which had enough green material to allow the cattle to select a diet without too much low quality straw. The regrowth after fire resulted in more available biomass of higher quality.... In addition to this regrowth the green tussocks remained available because they were left untouched by the fire due to their green foliage and isolation (Breman et al. 1978:8).

Breman argues that burning increases available protein from under 5% to almost 20%, ostensibly compensating for the loss in total graze. Breman’s work suggests that the critical factors are the timing and intensity of the burn. Similar studies are needed in other areas to allow for more general assessments of the widespread use of fire.

My intention is not to argue that there are no negative consequences of burning the range but to note how much more must be understood about the process and its effects before the judgment of the herdsmen should be discarded. Clearly, caution is indicated where the necessary data and analyses are so thin.

The popular image of pastoralism, derived from Ibn Khaldun’s biased reporting of the movement of the Bedouin into North Africa, is of a fierce, destructive, militarily organized force, rapaciously expanding at the expense of peaceful sedentary agriculturalists. The canard is repeated by even so distinguished a team of anthropologists as Lomax and Arensberg (1977:676) who recently wrote:

....virtually the whole of Afro-Eurasia has felt the influence of this patrilineal, sexually punishing, male-dominated, warlike, and essentially wasteful cultural tradition. Pastoralists overproduce as a guarantee against famine and as a sign of prosperity and pride, but large herds overgraze, and pastoral overgrazing has created deserts where gardens once were. Just as selective castration is practiced to improve the stock, so ruthless measures.... are taken to insure the legitimacy of patrilineal heirs. Clan loyalties and monotheisms spawn wars....

Under the aegis of the modern state, it is rather agriculture that has expanded at the expense of herding. Much of the losses experienced by Sahelian herdsmen during the recent drought appears attributable to the northward migration of farming and the consequent compression of the
pastoral range. In the Sudan, as in Senegal, herders have been deprived of dry-season range by the installation of irrigated perimeters along the rivers. Where herders and farmers are ethnically segmented, political elites more often are drawn from the latter than from the former, adding to pastoral vulnerability.

Sedentarization of herders, forced or encouraged, has been a recurrent strategy of the state. The consequences have often been ecologically unattractive:

Barth (1962) has described the results of sedentarization in the case of the Basseri tribe of Fars. Here during the reign of Reza Shah a government program to settle the nomads was instituted in the 1920s. Nomadism in Iran was then seen as an obstacle to modernization, a military threat, and therefore politically undesirable. It was argued then that in order to pacify, modernize and educate these people, it is necessary to settle them in village-like schemes. Barth . . . reports a sheep mortality of 70 to 80 percent when the nomads were settled . . . . During the period of forced sedentarization, since pastoralism is the only possible way of life in many districts of Iran where rainfall is inadequate for cropgrowing, Iran was deprived of many commodities such as milk, meat, wool, hides and draft animals (Darling and Farvar 1972:678).

Similar effects followed the attempts in the 1920s to sedentarize the Kazakh horse nomads in the Soviet Union and the Bedouin of the Egyptian Western Desert.

In East Africa, managed grazing schemes have been more vigorously pursued than in francophone West Africa — a reflection of the greater British experience with rangefed stock. The best known of these schemes have been among the Kamba in Machakos, Kenya, and in Maasai country in Kenya and Tanzania. The "sectional grazing schemes," some of which predate the Second World War, are remarkably close to the kinds of interventions now under way in the Sahel, under AID and IBRD sponsorship and funding.

These schemes [in Kenya] involved dividing a range area into several grazing blocks, instituting a relatively simple rotation system (based on the traditional movement of Masai livestock between wet-season and dry-season areas), providing water supplies and disease control, and attempting to provide for destocking by creating special markets. Livestock officers administered and supervised each scheme. These officers acted under special ordinances and by-laws, which empowered them to: (1) approve which Masai were allowed to graze . . . . (2) determine the number of animals each was allowed to graze, and (3) select the area to be grazed.

The first such grazing plan was the Ilkisongo . . . . This scheme, like the others, was a disastrous failure. By 1956 the area was severely

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1 "... government officials concerned with livestock [in Afghanistan] appear to have a rather good understanding of the ecological arguments for continued transhumance or nomadism. Possibly Afghanistan's position as neighbour to the rather disastrous programmes of settling nomads in nearby countries (Iran, USSR) has given its people a keen appreciation of what sedentarisation entails" (Sandford 1977:5).
overgrazed. In 1959, the destruction was so bad that where the scheme used to be, a jagged, bare, red earth scar in the savanna landscape was visible from a high-flying airliner ... (Talbot 1972:705).

In the Sahelian area, although there have been a number of experiments with ranches, in which animals were supposed to be confined within formal boundaries (such as the AID-supported Markoye, in Upper Volta), most of the predrought projects were relatively free of any attempt at sedentarizing the herders. In the early 1970s, the World Bank appraised two projects for the northernmost Sahelian countries, Chad and Mauritania. These projects are noteworthy for their acceptance of traditional livestock and land-management systems, and for their calm tones in assessing the ecological consequences of open-range grazing. Because the position taken in these papers is so discrepant from much of what has been heard subsequently, I shall quote from them at length:

The system of nomadic grazing of livestock is not conducive to the introduction of improved methods of animal husbandry, but at present it is the only form of land use for the Sahelian zone which is feasible on the large scale. The northerly movement of cattle to use pastures and water in the drier zones during and immediately after the rainy season reduces grazing pressures on pastures in the southern zones to which cattle return for the dry season. Losses from drought would increase considerably if there were a basic change from nomadic to sedentary grazing. . . .

In many areas of the Sahelian zone of Western Africa where communal grazing is practiced, overgrazing has become a serious problem leading to pasture degradation and soil erosion. Various measures for control of grazing have been attempted by countries in Western Africa but they have met with only a limited degree of success. Fortunately, overgrazing does not appear to be a serious problem in Mauritania at this stage. Studies suggest, in fact, that the available pastures could support more livestock than they do at present.

In any event, it is doubtful whether any systems of grazing control would be acceptable to livestock owners or could be enforced by the Government Services in Mauritania at this stage.

For some years to come, any proposals for developing or assisting the livestock industry will have to be based on the premise that the industry will continue to operate on a system of communal grazing with large scale seasonal movement of the herds. In this situation, feasible actions to assist the livestock subsector are virtually limited to those designed to improve the network of wells, to control animal diseases and to protect pastures against fire (International Bank for Reconstruction and Development 1971:6–7).

In 1971, the World Bank was able to state that the range is fundamentally resistant to long-term degradation from grazing: "The bulk of the pasture comprises annual grasses which have a short vegetative cycle and set seed by September. This type of pasture is not very susceptible to degradation by overgrazing as seeds are always plentiful for regeneration in the following season" (International Bank for Reconstruction and Development 1971a). The grasses set seed just at the end of the rainy season, when pasture is at its most luxuriant. The animals may graze the grass down to the ground as the
dry season progresses, but the seeds for next year's growth are already in the soil, awaiting the rains for their germination.

Similarly, the Bank's Chad paper makes no attribution of ecological degradation to the activities of pastoral herders, except where boreholes were introduced, and the excessive volume of water available led to overstocking. Yet even this is not claimed to have caused permanent damage:

Marked changes in the rangelands have been reported from Kanem Prefecture, and the predominance of annual grasses throughout the Sahelian zone is believed to reflect an ecological deterioration from an original community of perennial species. Extensive grass fires and increased cultivation of millet in marginal areas probably have a more drastic effect on soils and vegetation than the present rate of stocking.

The significance of these ecological changes is hard to assess, but there is little evidence of serious bush encroachment and depleted ranges regenerate quickly. Moreover, there is no evidence of significant soil erosion. High rates of water infiltration in the undulating sands and moderate to good grass cover combine to prevent erosion, even during high intensity rain storms.

Since stocking rate tends to be limited by the amount of pasture at the end of the dry season, there is always an abundance of feed after the rains, during which the annual pastures are setting seed. Thus continued seasonable regeneration seems assured and overgrazing during the latter part of the dry season is unlikely to have permanent detrimental effects (IBRD 1971a: Annex 2, 4–5).

Far from destocking the range, an objective of both the Chad and Mauritania projects was to increase the number of animals and the productivity of the pasture. This increase was to be achieved by opening of new pasture through the provision of water — dug wells in which the water must be drawn by hand. In Chad, each well was to serve an area of about 15,000 ha, defined by a 7-km radius from the well. A carrying capacity of one adult cattle unit and one adult sheep or goat unit for 10 ha was calculated. Thus, the well area of 15,000 ha might carry 2100 cattle and 1800 sheep or goats.

This is about the number of animals that can be safely maintained without danger of overgrazing. Since the minimum daily water requirement is about 20 liters per adult cattle unit and 5 liters per adult sheep/goat unit, and since traditional methods of drawing water can only provide a yield of about one liter/second, it follows that this is about the maximum that can be watered from a single well operating approximately 10 hours a day.

To increase productivity, the paper recommends allowing animals to graze freely at night as well as during the day.

2 Given the agrostologic conclusion previously reached in the IBRD Chad Livestock paper, "overgrazing" would appear here to refer to the inability of the range to provide sufficient food for the animals and not do damage to the environment itself.
It would be presumptuous to assert on the basis of the two Bank project papers for Chad and Mauritania, which were written before the impact of the drought was widely appreciated, that open-range grazing as practiced in the Sahel has more modest negative effects on the environment than would justify the trend to forced sedentarization. Yet there is the beginning of a body of evidence suggesting this position, and the evidence is emerging from agrostologists and rangeland ecologists whose hard-headedness and ruthlessly value-neutral empiricism, although human like the rest of us, is hardly open to question.

Peyre de Fabrègues, the Institut d'élevage et de médecine vétérinaire des pays tropicaux (IEMVT) agrostologist, concludes his 1971 study of Sahelian pastures in Niger, by remarking on the resilience of the range:

Changes in pasture produced by dry season grazing only last as long as that grazing continues. Indeed, it has been noted that annual, perennial and native plants have sufficient regenerative power, due to their seeds, to reappear as soon as the range is deserted for at least one year with good rainfall.

• The sometimes more spectacular increase in the relative abundance of annual plants from the first year in the most heavily stocked zones, and later in the burned areas, is a good reflection of what happens in rangelands, but is too diffuse to be easily measured. Nevertheless, it is an improvement, taking into account the preference of animals for annual forage plants.

• The influence of rainfall, although of major importance, changes vegetation only momentarily and in a way that can reverse itself.

Finally, from an agrostological point of view, it can be said that the present composition of the plant cover, established on the basis of average observations over several years, corresponds on the whole to a stabilized subclimax. Its forage value is practically identical to that of ungrazed pasture (Peyre de Fabrègues 1971, quoted in Bernus 1977:77–78) (emphasis added).

How pastoral systems relate to enduring ecological change in semi-arid rangelands is not known, but some geographers suggest that the notion of the Sahelian ecosystem as "fragile" is simplistic, and the term "resilient" is more appropriate (R. Kates, personal communication). The stock owners may prove to be less perpetrators of environmental degradation than they are its victims. To predicate a development posture on the undocumented assumption of the environmental degradation of herding is irresponsible and unjust and is inconsistent with the current ideological insistence on equity in development. To make informed judgments on the ecological consequences of herding, one needs longitudinal studies of agrostologic changes correlated with meteorological data, combined with close observations of pastoral and other uses of the terrain. The point is well made by Western (1974:24).

The stability of pastoral environments is more difficult to assess. It is frequently thought that pastoralism inevitably leads to overgrazing and a reduction in the long term carrying capacity of the region. ... The increased aridity of the Sahelian zone in recent millenia is an often quoted example of large scale degradation by pastoral overuse, either as a primary or a contributory factor. Against this, however, must be weighed the fact that pastoralists have inhabited the East African
savannah ecosystems for millenia. . . . And yet it is the so-called “pristine” nature of these environments that has attracted so much attention amongst conservationists. . . . Most concern centers on the arid areas, such as the Sahara, but these are precisely the areas where the most unstable climatic conditions exist naturally, and where natural erosion is highest.

Pastoralists, exploiting arid and semi-arid habitats, in widely dispersed parts of the globe with distinct cultures and histories, have elected not to develop private ownership of the strategic resource, land, although they practice individual ownership of animals and often of water; this fact alone leads one to suspect that the systems are ecologically sounder than their critics suppose. What are needed are facts, and the relevant facts are not available. “There has been no empirical assessment of the ecological efficiency of pastoral systems” (Western 1974:18). The logic of the “tragedy of commons” position is seductive, but it is not necessarily empirically valid.

access to land and water

In the 1980s, careful attention must be paid to the agreements regulating pastoral access to range and water. Although much of the development literature implies that there are very few constraints and the notion of the “tragedy of the commons” is predicated on open, unscheduled access to pasture, there is a body of documentation that indicates access is constrained by group membership. Unauthorized use of pasture may be met with persuasion, force, or legal action. In the Sahel, customary law courts hear cases in which litigants dispute each other’s jural claims to pasture, and such claims may be based on ethnic, descent group, or even family membership.

The best known system scheduling access to pasture is the dina, codified in its present form by Cheikou Ahmadou (r. 1818–45), governing usage of the interior delta of the Niger River in Mali. This code rigorously regulates access to and use of the vast resources of pasture that annually are flooded, and it allows for a complex exploitation not only by herders but also by farmers and people who derive their living from fishing (Gallais 1972). Imperato (1972:63, 67) witnessed the dina-regulated use of the Niger Delta in the late 1960s:

Approximately 163,000 Peul nomads participate in these seasonal movements, together with a million and a half cattle, a quarter of a million sheep, and half a million goats. Within the confines of the delta are another 250,000 Peul, semisedentary farmers and merchants who do not routinely take part in the transhumance treks, although they may do so occasionally. There are also large sedentary populations of farmers

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3 Communal ownership of lands was not customary in parts of Iran: “Prior to the 1960s, legal rights of ownership and of use of rangelands and mountain pastures were vested either in individuals or in tribes. . . . During the 1960s, with the advent of general land-reform, the entire nation’s rangelands and pastures were nationalized, and responsibility for their allocation and control was given to the Range and Forestry Organization (FRO) of the Ministry of Agriculture. . . . The FRO appears to have been largely successful in abolishing the payment of grazing rents to private individuals. . . .” (Sandford 1977a:5).
living on the periphery of the flood plains: an estimated 100,000 Bambara, 150,000 Bwa, 200,000 Minianka, 80,000 Marka, 250,000 Dogon, and 10,000 Songhai. . . . The plains are divided into 37 districts called leydi, which are the recognized communal property of given clans of Peul. Pasturing in them is governed by a complex weave of traditional verbal agreements and conventions established by Cheikou Ahmadou, one hundred and fifty years ago.

Effective rights of tenure are allocated not according to broad ethnolinguistic groupings, such as Fulani and Tuareg, but to far smaller named units identified with a particular location. The incredible complexity and organization of these rights has recently been reported by John Van Dusen Lewis, in his report to the International Livestock Centre for Africa on the Jafarabe Burtol (1978b). Groups without jural rights to use land are required to make substantial payments, and the amount of these payments influences the direction and timing of transhumance.

. . . in the Lac Debo burgue of the YallaBe to the west and the JalluBe to the east, stiff rents were charged to all comers, Macina FulBe or otherwise. The JafaraBe herders around us in the Kotia gave us two explanations for their not having gone on to the superior grasses of the Debo at this time. (1) The rent, at 10,000 FM per head plus one animal (of the herder's choice and therefore an older male castrate if he has taken the precaution of retaining enough of these in his herd) and, if the herd is on the large side, a female calf as well, was considered inhospitably high. (2) The concentration of cattle in the Debo area at this time increased the risk that one's herd, while grazing or moving to and from the camp to pastures would get mixed in with stranger herds (Lewis 1978b:5–6).

The dina may be the most spectacular of these codes but it is not unique; for example, the Syrian hema underlies a range management project in that country (Draz 1978). Lewis' material is unusual because he followed the transhumance over an extended time and was able to observe much of the decision-making about where and when to move. Most others who have written about the phenomenon have tried to reconstruct these decisions from discussions with the herders. Lewis has demonstrated once again that there is no substitute for genuine participant observation. Any development project that aims at establishing formal tenure to pasture would be well-advised to include sufficient field studies into existing relationships and to document how proposed changes would be an improvement.

In much of semi-arid Africa, access to pasture is functionally restricted, at least in the dry season, by well ownership. In general, water rights belong to the individuals or groups who build the well or who pay to have it built.

. . . natural sources of water such as streams, ponds, and water holes are not considered to belong to individuals or groups. In the rainy season in pasture areas water can be found nearly everywhere and, except for major ceremonies, people travel in small groups, spreading out over the landscape and thereby taking maximum advantage of fresh grass as it becomes available. Wells, however, are an entirely different matter. A well is owned by the person or group that dug it or had it dug. In principle, people other than the well's owner(s) may not use its water without permission. During the dry season, the Fulani move in small circuits about the wells which they own (Riesman 1978:21).
The allocation of rights to water is extremely complex among Jordanian Bedouin as among all pastoralists. The introduction of new water supply systems without regard for traditional controls often proves disastrous.

Asmarom Legesse describes how the Borana age-grade system serves to regulate conflicts over use of pasture, well water, and ponds and to mobilize resources for well construction (1973:85–88).
What is the lesson to be learned from this? To some, the degradation of the range is proof that pastoral herders, exploiting lands communally, inevitably destroy their own resources. From this perspective it follows that the programs to be established should be fundamentally discrepant from traditional practice. Others, who see the herders as having been made vulnerable primarily by interventions from outside, feel that what is called for is development programs firmly predicated on an understanding of how the herders manage their resources. Such an understanding can be obtained only when the herders become active, voluntary participants in the identification, planning, implementation, management, and evaluation of projects.

The problem of animal nutrition in the Sahel has too often been seen in terms of underavailability of water rather than of the balanced availability of water and forage. During the early 1960s, donors undertook the construction of boreholes fitted with diesel engines to provide reliable sources of water for herds. Instead of small groups of animals dispersed across the terrain in the search for pasture and water, huge numbers of animals began to assemble around these boreholes, particularly as the dry season progressed and surface waters disappeared; in consequence, the land for great distances around the wells was grazed to bare ground.

Each new construction of a bore-hole attracted great numbers of herdsmen. The traditional users of existing wells or ground water saw the arrival of nomads from all the neighboring tribes. . . . The estimate of 5,000 cattle or 10,000 head of livestock of all species, intended to ensure a balanced availability of pasture, was everywhere more than doubled (Bemus 1974:124).

When the drought struck, vast numbers of animals died for lack of food in ironically tragic proximity to the new wells (Laya 1975).

Wodaabe herders in the region of Bermou, north of Dakoro, Niger, oppose any government well-construction programs. They prefer to pay for shallow wells to which they will have exclusive access, as was traditionally the case, for they know that public wells attract animals from far away, from groups with whom they have not established agreements on range use, with a consequent overloading of the pasture and upsetting of the grass—water balance. If the government must build wells, they say, let it place the wells further north, in Tuareg country. The Wodaabe are willing to go elsewhere and pasture their animals in the dry season, but they do not want to reciprocate with access to their own pasture, a reciprocation that would be made inevitable by public water.

Sensitivity to the need to control the charge on pasture was reflected by the Bermou Bororo holding their 1977 worso or annual assemblage in proximity to a Tuareg well. Watering their animals from ponds, they nonetheless so heavily grazed the pasture with several thousand animals during a few days that the Targui owner was deprived of dry-season pasture for his own herds. Marguerite Dupire, whose study of these people is an ethnographic classic, points out that pastoralists are cognizant of the consequences of overgrazing and take steps to prevent it. No event is more eagerly awaited than this annual coming together of lineages, an occasion for dancing, contracting of alliances (both political and connubial), and general enthusiasm. Yet these longed-for festivities (when held on their own land)
are called off after only 1–2 days, "for the stockmen fear the destruction of pastures from too great a concentration of animals" (Dupire 1962:69–70).

The contribution to range management of privately owned wells was compromised by the boreholes, built by the international donor community at the request of governments. In certain regions so many engine-driven or artesian wells were installed that the range was severely threatened by overgrazing. These deep wells changed the transhumant orbits of many herders, concentrating vast numbers of animals on the narrow tracks linking the diesel-powered pumps, and disrupted previous land-use arrangements. In a well-documented case, Bernus (1974) showed how the Illabakan Tuareg of Niger petitioned to have the pump turned off, because the new source of water, available to any and all comers, had overcharged the terrain and exacerbated relationships between Tuareg and Fulbe (see also Marti 1972).

offtake

Although there is general agreement that offtake from pastoral production systems is low compared with commercial beef operations in the developed world, the data are inconsistent and unconvincing.⁴ According to the U.S. Agency for International Development's Development Assistance Plan for Upper Volta and Niger (1975), the yield increased from 7% in the early 1950s to between 11 and 13% in the late 1960s. Yet neither the rate of offtake nor the rate of change is verifiable. Using information recorded on sales growth rates for Upper Volta, Niger, and Mali, Shapiro (1976) estimated a 1968 harvest of between 7 and 9%, a far more modest figure than that stated in the AID document. Even the high guess of 13% annual offtake is often considered unacceptably low by developing countries and donor agencies who look to livestock exports as a major source of revenue.

Herd owners are accused of maintaining large numbers of animals in excess of the reproductive needs of the herds, thereby not contributing their share to the strength of the national economy and not providing the politically desired low-cost beef to domestic urban consumers. Excess animals are also considered the prime cause of range degradation through overgrazing. The available data do not, unfortunately, provide final answers to the question why herders retain so many of their stock from year to year. There is enough information, however, to challenge the assumption of irrational behaviour and to place at least some of the burden of proof on those who would, coercively if necessary, increase the yield. The issue is critical because the development posture of a number of states is based on the idea that pastoral practice is irrational and is the cause of secular environmental degradation. An entire strategy has been elaborated for the Sahel supported by these assumptions, in which the region is stratified into parallel zones: naissance or breeding area in the north; engraisseur or fattening area in the intermediate rainfall region; and consommateur or consumption area in the high-income south. For this strategy to succeed, animals will have to be removed from the semi-arid range almost as soon as they are capable of surviving without their dams and at the most at age 2 years.

⁴ Even the term is inconsistently used. For example, offtake may refer only to that fraction of the herd that enters the commercial market to the exclusion of animals consumed by the herders themselves. This truncated definition reflects the bias that the value of pastoralism is the contribution it makes to the well-being of nonpastoral peoples.
In discussing the factors that seem to produce current pastoral yields, I am not going to give price responsiveness the consideration it deserves, for the data are exceptionally inconclusive. Some students feel that herd owners set target incomes and therefore exhibit "backward bending supply curves," in which the number of market presentations declines when prices rise (Monod 1975:131). My observations of Wodaabe marketing in eastern Niger — though neither systematic nor comprehensive — indicate on the contrary that market activity increases with price. Grayzel (1976:4) did collect such information systematically for cattle sales in the Doukoloma Forest Area, and he notes a clear relationship between price and sales:

...the time and place of cattle sales is significantly influenced by national and international conditions. Thus taxes in March means there is an additional pressure to sell animals during a month when conditions already favor extensive selling, rather than in May or June when sufficient sellers are lacking. The poor quality of animals available in May and June in most markets is not because no quality animals exist, but, partially, because most are in the south, on transhumance, and are directed to the more lucrative Ivory Coast trade. The closing of the Ivory Coast frontier in Spring 1975, however, did not result in a redirecting of these animals, but in a disastrous drop in market prices that forced people to hold back from selling, and convinced them that such proposals as investing money to fatten steers for sale during these months was unwarrantedly risky.

One question that throws some light on the issue of price responsiveness is why are herd owners reluctant to sell young stock. Although young animals are offered from time to time — and a recent report (Eddy 1978) notes that a remarkable 50% of cattle offered for sale in Kao, Niger, are less than 2 years old — the costs of maintaining young stock are much higher than those for older animals; therefore, the net profit is much lower. Data from eastern Niger in the late 1960s and early drought year of 1970 showed that the price of an animal increased 5000 CFA francs (ca U.S. $20) annually from birth until full weight (about 6 years). Although live animals are almost never weighed in Sahelian markets, butchers and livestock traders are skilled estimators of true weight, and the weight gain is reflected in the linear increase in value as the animal matures. From age 6 to 8 or 9, with no appreciable weight increase, the value of the animal remains constant. The net value, therefore, declines. A test of price responsiveness of herders would be the degree to which animals are sold once they have achieved full weight. Yet there are additional factors — one of which is inflation — that may predispose the most economically hard-headed pastoralist to retain some of the old males.

What is the relevance of inflation? The conversion of animals to cash whose value is eroded by inflation is hardly a sound investment strategy. Allan Hoben (1976:38) has made this point in his discussion of Maasai retention of stock:

...buying cattle is the best available form of savings and investment and the best strategy for averting risk. Banking facilities are inaccessible to most Masai, and, in light of recent inflation rates in Tanzania, investing in productive goods, i.e., cattle, would appear to be the only rational course of action.
Walter Goldschmidt (1975) has proposed the introduction of tokens that would represent cattle "deposited" at a government bank and whose value would, in principle, rise and fall with the cattle market. I don't believe this innovative suggestion has actually been tried.

An understanding of herd demographic structures is prerequisite to an understanding of why a herder sells or does not sell animals; the first steps toward the former have recently been advanced by the exciting work of Dahl and Hjort (1976) and L.H. Brown. Brown approached the question of herd size from the herder's point of view, noting that the pastoral herding enterprise aims at the maintenance of a large human population directly on the income and capital of the herd. Brown (1977:37) simulated minimum herd sizes for East Africans totally dependent on their animals for subsistence. Although the West African stockholders consume substantial amounts of agricultural produce, and the figures must be adjusted accordingly, the line of reasoning shows that a large number of animals of both sexes and different ages is a survival requirement:

... one can estimate the number of animals needed to maintain a family of eight on a 75 per cent milk/25 per cent meat diet (5480 liters of milk and 876 kg of meat). Neglecting what milk may come from small stock ..., the milk requirement can be obtained daily from seven to eight cattle or four camels in milk. However, since the lactation period of cattle in range conditions is invariably short (usually less than six months), at least twice the number of cows (14-16) is needed to maintain a regular supply... In order to have fourteen cows in milk during the year, a breeding herd of twenty cows will be needed, if the calving percentage is about 70 per cent (a generous figure under many range conditions). To these must be added the female replacement stock, and several mature males (for it will not do to depend on one which may break his leg). In total a pastoral family in semi-arid areas must maintain 30-35 adult equivalent cattle to ensure survival from year to year. This number makes only marginal allowance for catastrophes...

Brown calculated a total of 31 adult equivalent animals: 20 female and 2 male breeding animals; 7 female and 5 male calves (under 1 year); 4 female and 2 male 1-2-year-old immatures; and 3 female and 1 male 2-3-year-old immatures. With this subsistence requirement, the herding family may be hard put to maintain the minimum number of animals for survival let alone increase stock for reasons of prestige. This important seminal work must be followed up with field study.

But what about the steers? Even among those who view pastoral practice with sympathy and admiration and suspect that pastoralists have adapted well to a marginal environment, the presence of large numbers of steers seems to render herder rationality problematic. For those without that sympathy and admiration, the retention of older males is proof of herder irrationality. Steers make no reproductive contribution to the herd and do not provide for herd rebuilding in times of decimation through drought and disease. Thus, the question is why have attempts to increase offtake among castrates met with herder reluctance.

Transhumant herding in semi-arid regions is a classically labour-intensive activity, and one hypothesis is that a major constraint on herd size is the amount of labour a herder can mobilize in maintaining the animals. As the herd expands beyond the herding unit's managerial capacity, it reaches
the point of diminishing returns, reflected in a marked increase in disease, predation, theft, runaways, and an increase in the costs of watering.

The idea of manageable limits to herd size is well-represented in the anthropological literature. It has been persuasively argued by Barth (1964) for the sheep-herding Basseri of Iran and has been noted by a number of students of Sudanic pastoralism (Cunnison 1966; Ahmed 1972; Asad 1964).

The labour crunch in the Sahel is heaviest during the late dry season, when animals must be moved regularly and watered from dug wells, and during the rainy season, when care must be taken to keep them out of the cultivated fields. At these times, steers may facilitate the pastoralists’ ability to manage their herds. The as yet unpublished observations of John Van Dusen Lewis strongly support this possibility. Writing of the Jafarabe Fulbe of Macina, Mali, Lewis (1978a:18) shows that the stock owners “like to keep up the proportion of male castrates to females as a way of maintaining the stability, unity, and tranquility of the herd thereby increasing milk production and reducing labour.”

... the herds were showing the effects of the arduous descent from the Mauritanian frontier. The Joro’s son asked me to take two calves in the back of the Land Rover for the late afternoon stretch to Togobali. Otherwise, he said, it would be difficult to get their mothers to abandon them and advance down the burtol with the rest of the herd. As it was, after the calves had disappeared in the Land Rover, their mothers went berserk and the Joro’s son had a full afternoon getting them down to Togobali. If it were not for the presence of certain steers in the herd, in whom these cows are said to place an implicit confidence, such females could not be induced to remain with the herd at all. Throughout the transhumance, these herdsmen were explaining to me that without steers to strike out in a linear grazing direction, their herding work would be quadrupled. Left to themselves, the cows would run around in circles after their calves and the bulls (usually two mature bulls per herd) after the cows. ... [The] junior herdsmen explained that the prize steers were selected for their looks, their post-sahel fitness, and their intelligence. This intelligence was measured by the confidence with which these steers led the herd away from the Delta and the Niger, that is away from a known water source, to the north Into the hot July sun. When that sun is glaring, they say, the cattle do not like to leave the smell of water behind them. Only the elder, intelligent steers appear to remember from one year to the next that not only is there water up north under that hot sun, there are delicious grasses as well (Lewis 1978a:54–55).

Lewis’ observations, drawn from his close association with the group during its transhumance, provide a new and perhaps essential link in our appreciation of the judiciousness of pastoralist decisions about cull rates. The novelist James Michener (1974) indicates that American cowboys also used steers to facilitate herding. Although the book that contained the information was fiction — Centennial — it was well researched.

In addition to their contributions to herding, steers in Mali are also kept to be exchanged for access to pasture:

... rents have to be paid throughout the transhumance to pasture-owning groups in those zones through which the migrations pass. As these rents are usually paid in single animal units it is good to have unproductive cattle available to hand over as rent, should it be
demanded. Otherwise, the pasture-owning group could send their representative into the herd to claim a productive animal. Therefore, transhumance as it is presently practiced precludes an optimal off-take from the herd (Lewis 1978b:32).

The low rate of offtake can be understood, not in terms of prestige, but in terms of survival in a difficult environment. This is not to deny that herders take enormous pleasure in possessing large numbers of animals. They do. They revere them in poetry and song. But that sense of prestige, and the reputation that is engendered by being a skilful and prudent herd manager, serves to underwrite sound ecological practice. Development programs and projects that fail to understand the fundamental logic of herd structure and herd size, given the kind of enterprise in which pastoralists are engaged, will inevitably be faced with participant resistance and will reinforce the poor record of project success in the pastoral livestock sector.

mobility

Most discussions of pastoralism today avoid the sterile typologic concerns that dominated earlier thought. There is now general, if not universal, agreement that there is little profit in classifying herding peoples as "nomads," or even "true nomads," "seminomads," "transhumants," or the like as if these terms describe discrepant lifestyles rather than alternative strategies forming the response inventory of animal managers. In Marguerite Dupire's description of the Tahoua Wodaabe (1962), the pendulum-like swing of herders in and out of farming showed that a particular kind of movement is not inherently characteristic of a pastoral society.

The earlier interest in typology had the virtue, however, of focusing on movement as the major technique for the efficient and healthful exploitation of semi-arid grasslands. It is curious that among the many studies of pastoral societies that have been published in the last 30 or 40 years very few have been actual observations of a full pastoral round. It is perhaps because of this critical lack of descriptive material that planners again and again propose interventions that constrain pastoral movements, under the assumption that these movements are environmentally destructive. Such positive evidence as exists comes more likely from biologists, such as D.H. Janzen (1973:1214) who writes: "Some studies even suggest the 'overgrazed' pastures may have a higher overall yield than more carefully managed sites, especially if the real costs of management are charged against the system." Western (1974:12-13) supports this view:

Pasture quantity and quality have been shown to have a high annual, seasonal and spatial variation in arid savannahs. A given site will show a much higher variation than the region as a whole and a static system of ranching would experience a greater absolute fluctuation in pasture conditions than mobile forms. However, mobility will only confer an advantage if it can obtain a higher production than a sedentary livestock economy in which stocking rates are adjusted to overall range carrying capacity.

It is well established that a pasture is more nutritive during the growth than non-growth stage . . . ; the plant mass contains a higher component of digestible crude protein and carbohydrate. . . .
A very real advantage can therefore be derived from mobility geared to select growing pastures — a high proportion of the forage can be assimilated rather than passed through as faeces.

The same pasture may be 70% digestible when green, 30% when dry, a low utilization in the green phase will mean a loss of potential, consumable energy. Mobility is primarily a strategy to maximize the intake of high-digestibility forage, leaving till last that of low digestibility. This strategy has resulted in the successive use of habitats in the African savannahs. ... In effect it reduces the effect of the highly seasonal growth cycles, and ironically it is the highly spatial variation in precipitation that permits this! The sensitivity pastoralists have of pasture differences and variation is extremely high because they can monitor marginal differences by milk output.

A most useful, carefully documented set of observations of the annual movements to and from the Interior Delta of the Niger has emerged from Projet production primaire Sahel (Diallo 1978).

Development interventions that attempt to restrain herd movements seem to be designed on the basis of data gathered in years of adequate rainfall and come unstuck in years of drought. They seem not to be cognizant of the enormous and unpredictable variation in the quantity and distribution of rainfall, which results in tremendous differences in the availability and quality of pasture. For example, a research station in the Ferlo, Senegal, reported such a variation in an area where mean annual rainfall is 200–300 mm. In a "normal" good year useful rainfall is 110 mm; in a "normal" bad year 50 mm; and the respective productivities in terms of aboveground plants are 1300 and 590 kg dry matter/ha (Bille 1974). The theoretical carrying capacities of 1000 ha during good and bad years are 187 and 87 head of cattle. In 1972 the figure for all three parameters was zero. Thus, a herder locked into the Ferlo in 1972, without the right to move, would have lost 100% of the herd. To minimize such loss, the rational strategy is to move from the deprived area to one more favourably treated. Yet the fundamental development posture of many planning and donor agencies attacks this strategy by restricting or attempting to restrict animals to a specifically demarcated piece of land. For example, the World Bank Senegal project, which is in a region that is better watered than the Ferlo but exhibits quixotically variable rainfall and, consequently, plant cover, includes a range management program in which some 1.4 Mha will be divided into 65 grazing units within which the herders — "a group of 100 families of eight members on average..." — will be required to remain permanently. The managing corporation is vested with the power of the state to ensure the inviolability of the boundaries around each unit. Although such a program may be reasonably well adapted to the good years, it clearly raises concern for the poorer.

Climatic variability seems characteristic of the entire pastoral zone. Not only is the total amount of precipitation highly variable, it varies in temporal and spatial distribution. In 1949, Mainé-Soroa, in Niger, had 230 mm total rainfall; total precipitation for Diffa, some 50 km further east along the same latitude, was only 67 mm. Thus contiguous areas can experience much difference, and the ability to move from one to another is critical for animal survival. Within a year at any given location, total rainfall is less significant than useful rainfall, which refers to its distribution during the rainy season. This, too, is highly variable.
Studies of cattle transhumance from the Malian Delta to the Mauritanian Sahel by Projet production primaire Sahel indicate that those animals who participate in the trek, despite the vast distances covered — more than 1000 km every year — return in better shape than the good milking cows and their calves that remain in the village throughout the year. "The food supply for these cows seems to be worse than for the herd which migrates in the Delta and furthermore they are plagued by ticks. When they rejoin the herd at the beginning of the dry season, they are in a worse condition than the other cattle. Most probably this adversely affects both birth rate and calf mortality" (Breman et al. 1978:14).

Field studies carefully documenting the microecology of pastoral mobility should be undertaken as a precondition to every intervention that seeks to alter movements by pastoral units or to introduce other forms of constraint on a herding population.

women in pastoral societies

Herder participation in the identification, design, implementation, and assessment of livestock sector projects has been marginal, at best. Participation of women has been nonexistent. Whereas the role of women in agriculture has begun to be explored, the economic role of women in pastoral societies has been simply ignored in the development documents I have examined. This is most unfortunate, because the position and the status of women in pastoral societies are threatened by the very objective of many of the productivity-oriented interventions: converting the economy from one that emphasizes dairy production and the feeding of the herding population directly on the produce of the herd to one that emphasizes meat production and the feeding of urban populations.

The high calf mortality under semi-arid range conditions in Africa has been attributed in part to competition for milk between the calf and the pastoral population. Where a large population is fed on slender quantities of milk, male calves may suck only milk that is surplus to the needs of the family. During the rainy season, when both grass and groundwater are abundant, there is sufficient milk for the people, the calves, and for sale directly or as sour milk, butter, and cheese. Derrick Stenning (1959:102–103), in his monumental study of the pastoral Fulani of Nigeria, underscored the importance of milk production and the role of women in relation to it:

Good husbandry for a Fulani herd-owner thus involved maintaining a milk yield sufficient to support his dependants at all seasons. Lactation must not only be adequate, it must be continuous. Since lactation is dependent upon the birth of calves, the main interest of the herd-owner is in a steady yearly increase in his herd. . . . The supply of milk available to calves and humans has to be controlled by careful milking. Among the WoDaaBe the division of these tasks between the sexes is clear-cut. Men have to do with cattle, their seasonal movements, daily pasturing and watering, and veterinary care. Women have to do with milk and its marketing, in addition to their domestic tasks of food preparation and the care of the homestead both at rest and on the move. Adult men are herd-owners and managers, male children and adolescents are herdsmen. Adult women are dairywomen and purveyors of milk, female children and adolescents are dairymaids. The WoDaaBe family is a herd-owning and milk-selling enterprise.
Given this strict division of labour, and a herd of a certain size, a herd-owner's family must attain a size commensurate with its responsibilities towards its herd. It must also maintain a balance of the sexes, so that these responsibilities may be efficiently carried out by appropriate members of the family.

In a beef herd, the calf has the prime claim on milk, or rather, the calf is a surrogate for the urban consumer of beef. It is thus essential, when advocating increased emphasis on meat production, to assess the nutritional impacts on the herding population in general, and the specific economic costs to women in particular. Let me explore the latter briefly.

Stenning says that Fulani women are responsible for marketing of milk and milk products; men are responsible for the marketing of animals. Whereas both these activities occur under the traditional pastoral enterprise, in fact women enter the market more frequently, albeit each transaction is small, and in the aggregate contribute substantially to the total income of the household. Now even if the total income were to increase with greater emphasis on beef production, an often stated though seldom demonstrated proposition, the contribution of women would of course decline. They would lose both control over the income from dairy sales and the status attendant on making decisions relating to the family's food supply. Mary Hooglund (1977:4), who examined the final design report for the AID Eastern Senegal Bakel Range Livestock Project, concluded that if the project were implemented:

Women would be left without an important labor input into the family economy and without control over family resources. As the status of women depends practically on their position in the subsistence system and symbolically upon the number of milking cattle at their disposal and on the related number of decorated calabashes hanging over their bedsteads, the status of women in general among these Fulani would suffer. The status of individual women whose husbands join the project will decrease in relation to other women who have more milk cows at their disposal.

Where half the society is placed in jeopardy, it is fair to assume that the half — pastoral women — will be most reluctant participants in the projects. The question remains why have projects gone from identification to implementation without ever facing up to their impacts on women (and children). As Paul Riesman (1978:27) says: "the less visible women's sphere cannot be ignored. . . . The effect on the life of women — and thereby on the whole family as a productive unit — of such changes as greater orientation to beef production or commercial milk-marketing schemes would have to be carefully thought through and preferably discussed with all parties before being tried."

The ignorance of the roles of women in pastoral society is perhaps due in large part to the fact that few women ethnographers have studied herders. This traditional male dominance is being challenged today, and increasingly women scientists are doing fieldwork among herders (for example, Dawn Chatty among Syrian Bedouin and Muneera Salem-Murdock among Sudanese Shukriya, in addition to several of the participants in this conference). Such studies should be expanded, and host country women scientists should be encouraged to conduct research in the pastoral arena.
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conclusion

In this paper I have tried to indicate some of the priority areas for social science research among pastoral peoples with the aim of providing the sociological and ecological basis required for the generation of soundly designed development interventions with the objectives of improving the producers' income and expanding their opportunities; increasing pastoral productivity for local, domestic, and export consumption; and retarding or reversing environmental degradation. The responsibility rests in part with the planning community to ensure that the findings of the social and biologic sciences are well-integrated in project and program design, but responsibility lies also with the scientists to ensure that their research yields the understandings that are relevant.

discussion

Salih: I am glad Horowitz emphasizes the importance of demographic knowledge of pastoral nomadic societies. Demographic data are important not only for pastoral studies but also for all rural development projects. In my view, any development project has to consider demographic processes.

Furthermore, I want to explain briefly the importance of anthropology in development. First, nowadays there is a strong tendency toward interdisciplinary studies. Here, anthropology has a special importance because of its holistic approach. Since its inception, anthropology has been concerned with studying various aspects of social life — environment, kinship, culture, economic activities, religion, values, law, etc. So it has a long tradition in the interdisciplinary approach, and, when we need this approach, anthropology fits into it more easily than do other social sciences. More important, the anthropologist can assume the role of coordinator not only among other social sciences but also between the social sciences and the natural sciences, like those of the veterinarians, agriculturalists, ecologists, nutritionists, physiologists, etc.

Finally, today there is a need for first-hand information. This entails fieldwork, which for a long time has been the prerogative of anthropology. Today, students of economics, political science, geography, public administration, etc. are carrying out fieldwork in the same manner as anthropologists. So they are using techniques that have been developed over a long period by anthropologists. These are the practical reasons that anthropology should regain its importance in modern development studies.

Schneider: Professor Horowitz's concern with political economy seems to apply only to the relations of pastoral and agricultural people. This seems to imply the questionable notion that a society is some sort of superorganic entity that adjusts like a great mechanism to its circumstances. It is individual households that react and adjust, often in competition with each other. In my paper, I stress how important are links between these units. The internal policies of these societies are crucial to many of our concerns. Political considerations often lead a person to transfer livestock to others, even at the risk of destroying optimal arrangements for such things as milk production. We do not know enough about the economics of stock associateships, and I urge this group to add the need for further investigation of this aspect of these societies to its priorities.
Galaty: Horowitz has set forth a set of research priorities dominated by economics and ecology, to the exclusion of many domains in which anthropologists have developed a high degree of expertise and methodological sophistication, such as that of kinship. Further, recent studies in the economics of precapitalist societies — pastoral societies in particular — have emphasized the fundamental role of such institutions as kinship, ritual, and religion in the organization of production, distribution, resource use, allocation, etc. It may be more appropriate to begin with a core of concerns relevant to development and then see whether they lead to institutions often ignored by other disciplines but recognized as consequential by anthropologists. For instance, if resource allocation leads to the kinship system, it should be followed down that line. In such a way, anthropology’s expertise and insight into the admixtures of institutions can make a meaningful contribution to development studies.

Marx: Horowitz’s paper was oriented toward development studies and ignored many other interesting questions. Why should there not be more emphasis on traditional questions and the development of anthropological theory, as Schneider and Galaty have suggested?

Horowitz: All these other topics may be relevant, but I would not at present see them as research priorities. Increasing collaboration between the biological and social sciences is necessary; therefore emphasis on our unique problems may be inappropriate if anthropology’s influence in development is to grow.

Aronson: I would emphasize the priority of the political economy, as identified by Horowitz. Perhaps the situation in Kenya is too benevolent; its example may distort how we see the situation in other countries. Elsewhere, power and its relationships are profoundly important in what happens to pastoral peoples. Without an understanding of these factors, the questions that Landsat and other methods address have little relevance.

There are three levels for research:

- The international level, including the relationships between donor countries, aid agencies, and the nations of concern; it is significant that countries with large pastoral populations are generally in the worst shape;
- The national level, including relationships within the nation and the claims that people can make on land, as in the consideration of "national homelands";
- The local level, where development ideology may be less important than careful study of actual projects.
livestock and livelihood: a handbook for the 1980s

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Pastoral peoples seem inescapably caught up in the drive for development of food productivity in arid and semi-arid regions. Although, in the past, anthropologists and social scientists have been involved in some development efforts affecting pastoralists, it is now clear that they must be even more directly concerned. Those with experience in development-related research have been hampered, we feel, by a difficulty not only in communicating with each other but in letting the rest of the scientific community know the significance of their work.

One result, it seems to us, is that development-related research has acquired a noncumulative character in the sense that neither research results nor the recruitment of new researchers into the field seems to be building in any particular direction. Despite the existence of journals specializing in applied anthropology and of journals concerned with regional and national development problems, much of what one reads, although often of high quality, is episodic and, more often than not, an account of failure. The involvement of social scientists in development efforts now impinging on pastoralists has been not only noncumulative and episodic but also ineffective, or, at any rate, less effective than we would wish.

The suggestion we have to make — creating a handbook or guide for development-related research — is certainly no cureall, but if it achieved only a few results, we feel the effort would be worthwhile. One possible result would be a systematic review of development-related research. If presented in the context of a functional framework that captures the major kinds of problems with which pastoralists must cope, such a review might well lead to a more coherent and cumulative series of research involvements in the 1980s and beyond. Furthermore, a handbook could be of great use in recruiting students to development-related research and in aiding officials of funding agencies to set their priorities for support. Our suggestion is partly stimulated by the usefulness of Reining’s handbook on desertification (1978).

We propose a handbook based on the sources of change and uncertainty to which pastoralists must respond. One source is pasture — its nature, quality, and productivity. A second source is the herds as well as the quantity, quality, and variety of livestock produce. A third is water-related; a fourth is available transport. Other sources are economic and political, including households, the organization of labour, the rights to stock and pasture, and the organization of exchange relations.
All the sources of change are closely related to the regional context within which pastoralists operate. Too often, pastoralists have been studied as isolates, only tangentially related to other pastoral groups or nearby complementary or competing groups of farmers, peasants, villagers, or city dwellers.

Although in the past — and not so long ago at that — there was some merit in perceiving pastoralists as being an ideal type at the opposite end of a spectrum from cultivators, recently a more fruitful emphasis has been to trace the pastoral group’s interconnections with others — other pastoralists, farmers, villagers, and the like. Other than environmental parameters, such as terrain and seasonal rainfall, these interconnections are possibly the best delimiters distinguishing one region from another.

Delimiting a region is important because, in our experience, most development schemes attempt to effect regional or areal upgrading. For example, a scheme to promote a cash crop among farmers is likely to make it more difficult for pastoralists to secure the grains they need for food, and this disturbance must be coped with; the solution is likely to be regional in scale.

**technoenvironmental sources of change**

Conventional wisdom is that pastoralists only stay long enough in an area to ruin it. Even among planners and experts in rangeland management, few question the assumption that indigenous livestock management techniques are inherently inefficient if not actually destructive (Baker 1975b; Pratt and Gwynne 1977). Although many social scientists have demonstrated that the assumption is not well founded, further research on pastoral—habitat interaction is of paramount importance (Conant 1980). There are several reasons for urgency. First, planners, technical experts, and national decision-makers do not appreciate that in arid and semi-arid areas a benign environment is largely a human creation and much is to be learned from those who have exploited it for long periods. Second, until now no system has demonstrated better energetic efficiency than extensive pastoralism in these areas (Little and Morren 1976; Moran 1977; Western and Dunne 1979). Third, if the continuing, and increasing, food shortage in many countries is to be ameliorated, development planners must begin working within proven systems of food production. Strategies that involve heavy investments in capital and infrastructure or that entail locally untried solutions are inherently dangerous (Holling and Goldberg 1971). Planners and others must learn to work with herders rather than around them, recognizing that habitat maintenance, levels of productivity, and livestock management are directly affected by the available technology. The first step is to understand the sources of change.

**pasture-originated sources of change**

Too often in the literature, it has been assumed that local plant cover is an environmental given — a natural and distinctive feature of a particular habitat. Whereas spatial and temporal variability in the quality and abundance of pasture is widely recognized, much less common is the realization that the nature and the variety of the plant cover are stringently conditioned by human activities. In arid zones, an agricultural oasis stands
out as an obvious human artifact, a true creation. But few people appreciate that the vast areas occupied by pastoralists are also largely a creation, an artifact of pastoral exploiters, who, in the context of a highly unstable environment, have maintained a changing but usable plant cover.

The energetic basis for pastoral production is the plant cover, and changes in it are immediately reflected in the pastoral economy. The pathways through which the changes are effected are not the sole province of the rangeland or veterinary scientist; they are the immediate concern of the social scientist as well (Western and Dunne 1979; Dyson-Hudson and Dyson-Hudson 1969; Gulliver 1955). The particular mix of plant species and their tolerances establish the range of livestock options open to local populations. A detailed understanding of these options, as they have evolved, is critical to rational development planning in arid and semi-arid zones.

The part played by wild herds in the creation and maintenance of evolving plant communities is only beginning to be understood (McNaughton 1976; Pratt and Gwynne 1976). The role of domesticated herds as managed and directed by pastoralists is somewhat better known, but grasslands are still perceived by many as being natural phenomena rather than largely a human maintained resource (Langdale-Brown et al. 1964; Baker 1975a,b). A basic query is whether these areas are being maintained at optimum levels of productivity. The answer cannot be drawn from superficial impressions and simplified assumptions. Pastoral subsistence systems are not simple. The complex interactions they involve are as intricate as those involving agriculture. In fact, the maintenance of a usable plant cover may be in some instances every bit as much a feat of environmental manipulation as, say, shifting cultivation. For example, the Pokot of Kenya, from 1974 through 1978, were unable to herd their livestock in Simbol, a grazing area used for many generations. Before intensified raiding forced them to abandon the area, they managed mixed herds of cattle, goats, and some sheep so as to maintain a grassy cover and restrain the spread of *Acacia misera* and *A. mellifera*. Goats, as the major browsing component of Pokot herds, are voracious predators of *Acacia*. Another factor is the seasonal fires set by the Pokot. The intense but transient levels of heat created by the flames sweeping over the area have complex effects, one of which is to keep in check *Acacia* pioneers. For 5 years — now going on 6 — the Simbol area has been unoccupied, and analysis of the Landsat data for the period shows that Simbol has become a sea of thorns, the grass has retreated, and in all likelihood the area is lost permanently as a pastoral resource area (Conant 1980). The Landsat data provide information on the extent — beyond Simbol — that the *Acacia* species have taken over. Locally, a minimum 8000 ha are involved; as the Landsat data analysis is extended regionally, it may show an increase (by a factor of 10 or more) in the area newly dominated by *Acacia*.

A. Endre Nyerges (1979), in a study of traditional animal management techniques in an arid region of northern Iran, views pastoralism as an intrinsic feature of rangeland ecology. Nyerges finds a close relationship between the distribution of annual grasses and sheep and goat foraging activities, and a less obvious relationship between shrubs and animal behaviour. Although he is cautious about drawing conclusions for planning from this preliminary research, he does demonstrate effectively that research should be directed at
formulating development strategies that are not disruptive of established relationships.

In the Turan of Iran, he finds that even the distribution of shrubs that are only lightly grazed by animals is related to the germination and spread of more usable annual grasses. Certain shrubs provide around their base a sheltered environment from which annual grasses can spread. The introduction of new species of animals as well as alterations in patterns of management can have, he suggests, deleterious, or at least unexpected, side effects.

livestock-originated sources for change

Pastoralists must contend not only with herd size and age—sex structure but also with the mix of species being herded and their differential deployment. Rather belatedly, students of pastoralism have come to look closely at the demographic characteristics of the animals utilized (Dyson-Hudson 1972). Although some pioneering work has been done (Dahl and Hjort 1976), much more research is called for. One obvious area of inquiry is the manner in which different species are managed and the ways in which the ratio of browsers: grazers is manipulated. Almost everywhere, traditional livestock management systems are characterized by a mix of species. Today, under strong pressure from a variety of sources, some pastoralists are tending toward monospecies management. This may diminish the traditional system's potential, especially in the context of habitat maintenance. In many areas of the Middle East, the last decade has seen a dramatic shift in sheep production at the expense of the mix of species. In relatively fewer areas, there have been parallel shifts in cattle-raising to the exclusion of other stock. The ecological effects of these shifts are pronounced in some areas but, thus far, little studied.

In fact throughout the Middle East and Africa it appears that management strategies regarding sheep and goats are woefully understudied as compared with those in the raising of larger stock. The literature on East Africa often implies that goats and sheep manage themselves, or, in some insights, the goats are said to manage the sheep (Pratt and Gwynne 1977; Rigby 1969a; Tanaka 1980). There are good indications, however, that the management of goats is a critical aspect of pastoral ecology and household economy, and some evidence among Pokot points to the important role of women in the management of these small stock. Quite apart from its ecological implications, small animal husbandry makes good economic sense. Small stock mature quickly, compared with larger animals; reproduction rates are higher; and risks of loss per unit of biomass may be minimized. Also, in terms of nutritional inputs, small stock often provide the more regular source of animal protein. Furthermore, whereas the literature often emphasizes the exchange value of camels and cattle, recurring household needs are often met by the sale or exchange of a goat or sheep.

water-originated sources of change

Because of the obvious environmental and social implications, modern water-delivery systems have been relatively well-studied as they affect pastoral people, but much more research is called for on pastoralists' response to deep-well technology, earthen-catchment basins, and other technologically innovative changes in the supply, storage, and delivery of
water. Few studies in the Middle East or Africa can match the detailed level of analysis reached by Downs in his study of the social consequences of a dry well among the Navaho.

Insofar as pastoralists are concerned, a central feature of innovative water technology is the sedentarization often required for the use of new facilities. Another aspect is the relatively impersonal supervision of the facilities by government employees who may not even be from the local area.

The study of indigenous systems of water discovery and delivery has been seriously neglected. In East Africa such systems are rarely permanent in pastoral areas; each dry season many wells are redug. One effect is to avoid some of the complications arising from modern, permanently located boreholes. Although we would not argue for replication of the risky and labour-intensive hand digging of deep step wells, there is much to be learned about the ecological benefits deriving from impermanent wells of limited yield. One benefit is avoidance of a permanently trampled area around the well head and intense grazing of surrounding vegetation. Moreover, indigenous well technology is usually associated with complex institutional arrangements that themselves deserve close study, especially in the context of water failure.

livestock products

In all pastoral areas there is a near revolution in terms of the use and demand for animal products. Some products, such as camel and goat hair, have fallen from favour; other demands have increased enormously, especially for milk and dairy products as well as the general demand for animal protein. The increasing demands largely coincide with population increases and urbanization. Further, the modern technology in meat processing, preservation, and transportation means that a local herd may supply the protein needs of distant populations. At the same time, one result is that entire regions formerly self-sufficient in terms of protein, such as Saudi Arabia, and some other states of the peninsula, now rely on distant sources of supply.

Although specialized ranches in Australia, New Zealand, and Argentina represent the extreme where local strategies of production are dictated by the demands of distant markets, a similar trend is discernible in parts of Africa and everywhere in the Middle East. In the Middle East, virtually all livestock production is market-directed and governed more by the demands of distant populations than by the long-term interests of the livestock managers. From the perspective of habitat maintenance, a particular mix of browse and graze animals may be essential. However, the demands of the marketplace as well as distant bureaucratic decisions and changing urban tastes combine to promote changes in livestock management: stocking densities may outweigh carrying capacity; one species may be favoured over a mix of species and the pattern of grazing on local vegetation is modified; the age—sex composition of the herd may be altered; or nutritional levels may decline because livestock produce previously destined for household consumption is rerouted to the marketplace. The Yoruk of Turkey, for example, sell most of their butterfat production and purchase vegetable oils on the market; further, they sell their wool and stuff their bedding with synthetic products or cotton (Bates 1973). Changing demands and tastes are inevitable and often present opportunities to which pastoralists respond. However, much remains to be
discovered about the impact on local environments of changing demands. To date, among pastoralists, there have been no studies comparable with those on the nutritional effects of changing patterns of diet and labour carried out among agriculturalists.

The changes induced by a market orientation are concomitant to revolution in transportation. In traditional systems of pastoralism, available transport — pack animals — sets many restrictions on the range of distribution of livestock and livestock produce exchange. In some areas, however, live animals are moved by truck and rail to distant pastures; this is especially true in the Middle East. Today flocks of sheep are trucked from diverse regions of Turkey to the summer pastures of the Taurus and Zagros that were formerly the exclusive domain of local villagers and herders. In Syria, Jordan, and Saudi Arabia, sheep are trucked deep into areas formerly utilized exclusively by camels. In some cases the effect on plant cover is devastating.

**economic and political sources of change**

A second and equally important source of change — proposed as an emphasis in the handbook — is the sociopolitical correlates, causes, and consequences. This is the natural habitat for most social scientists, and, as a consequence, is the area in which most research has been carried out. There are, it strikes us, a number of areas for further research of an urgent nature. These include the organization of pastoral labour, responses to changing markets, and shifting internal patterns of political organization.

People develop their social organization in response to problems of livelihood, defence, environment, and the like. What is sometimes lost sight of is that the social responses have costs and consequences and may in turn generate further changes and sometimes unacceptable costs. In many of the projects reviewed by members of this conference all too commonly the social organization of the affected population is treated as a simple dependent variable — that is, one that simply passively responds to new situations without in turn affecting them. There often appears, for example, to be little understanding of the way in which pasture rights are integrated into a system of household organization and political structure.

**households and the organization of labour**

The organization of domestic labour is of particular importance because productive decisions in most instances are made in the household. This is true in market and nonmarket contexts alike and is not diagnostic of a particular economic level. Division of labour by sex and age is often critical to effective livestock management given that most households must orchestrate a variety of tasks being carried out at different places and different times. A division of labour underlies the way in which households utilize available resources (Irons 1975).

Throughout the Middle East and Africa, we can see radical shifts in the tasks that are organized by pastoralist households and concomitant shifts in the division of labour and the composition of local groups. In the mountains of the Sinai, women and children tend flocks while adult males work in agricultural projects. In Turkey, by contrast, many high pastures have tents inhabited only by male shepherds, with women remaining in towns and
villages. In one lowland area among the Pokot of Kenya, more than 40% of the households have women as heads; men are absent on a variety of tasks.

The current trend in the Middle East is for wage labour to be increasingly incorporated into the activities of a household. Younger men are frequently not found in many encampments (Cole 1975). The social costs of such shifts in social organization are as yet relatively unstudied, although the consequences are likely to be significant.

Flexibility in the division of labour, however, can be limited by considerations of security. In Turkey, as mentioned, some highland areas have been largely abandoned by family units, the herding being left to armed males. Much the same is happening on the Pokot lowlands.

Even in populations described as having a domestic mode of production extrahousehold sources of labour are often critical. This is true for virtually all pastoral groups described for the Middle East. Nonhousehold sources of labour include hired shepherds, shepherding contracts, labour exchange, herd pooling. It is not at all unusual for labour to be contracted from outside one's own natal group.

In Africa, the organization of labour within pastoral populations is often more complex than it appears. One of the functions of age grades among African pastoralists is to provide an organizational basis for extrahousehold sources of labour, as in the management of dry-season camps (Peristiany 1951). The description of the organization of extrahousehold labour is largely lacking in the literature despite its significance for change, both traditional and development-related. An important exception is a recent work by Almagor (1978).

A critical problem in the Middle East for many pastoralist groups is a shortage of skilled labour. Expert herders are in short supply. The problem is exacerbated by the rapid shift due to labour-intensive sheep production at the same time that many seek wage-paying jobs away from home. Some tasks used to be done at home, but now pastoralist production is increasingly segmented. Wool processing and dairy goods production are increasingly removed from the household.

organization of stock and pasture rights

The social regulation of access to resources is closely related to levels and forms of productivity. It is also of clear relevance to planning and development. The regulation of access to resources has an obvious technological dimension. Tank trucks bring water to flocks in remote desert pastures in Arabia, thereby removing one constraint on utilization. Mechanized transport of the herds and flocks has already been noted. Of equal importance to the technological component is the institutional framework for governing access to resources. The literature on the Sahel is rife with reference to the "tragedy of the commons" phenomenon, often singled out as the cause of overgrazing and pasture collapse (Hardin 1968).

Communal ownership and rights are not inherently destructive, nor is individual access or ownership a panacea. It is not so much communal or individual rights that matter but the way in which responsibilities are seen as being associated with rights of access. People who perceive themselves, or are perceived by others, as having long-term interests in pastoral resources are likely to develop and accept constraints on their use that maintain and preserve them. A good example is the reinstitution of the hema system of
pasture rights associated with specific clans among the Bedouin of Syria, Jordan, and Saudi Arabia.

The use of an area for both agricultural and pastoral purposes is often regulated through a system of tenure or access rights. In the Middle East, for example, many areas of pastoral land use and control are legally state, crown, or "waste" lands. Where specific pastoral title is not recognized, it is difficult for pastoralists to resist agricultural expansion or for those in search of firewood to resist incursion even though they destroy the browse. Gleaning for fuel has bared substantial areas in both the Middle East and Africa.

Another example of the effects of a lack of local control over an area is that of the Yomut Turkmen in northern Iran. Before the 1920s, pastoral Turkmen maintained effective control over the pastures they utilized. Following their "pacification" by the forces of Reza Shah, most of their pastures became state-owned, crown lands. At first this distinction meant little in terms of use. But by the 1970s entrepreneurs residing elsewhere had begun to bring tractors and crews of labourers putting these lands to the plow in a form of high-risk mechanized agriculture. As a consequence, much pasture has been lost through wind erosion. Agricultural productivity is highly variable and probably profitable only because the cost of crown land is so minimal (Bates 1979).

A positive example from West Africa demonstrates the effectiveness of local control over an area used by both agriculturalists and herders: the Fulani gain access to fields that have been harvested and feed their stock on the remaining stubble (Stenning 1959). Mutual arrangements of this sort in the Middle East have largely disappeared because of shortened fallow periods, the use of artificial fertilizer, and irrigation.

the organization of exchange relations

Since Barth's (1964a) pioneering study of capital and investment, the organization of exchange relations has occasioned considerable research and discussion. What is needed, it seems to us, is specific attention to the effects of changing markets and other conditions of formal exchange on the raisers of livestock. How do people change their productive strategies in the face of shifts in prices, production costs, and demands? The stock raisers are in fact responding to changing exchange relationships (Swift 1979a). In the Middle East, it is obvious that any notion of a sufficiency-oriented mode of pastoral production is of little value. Opportunism and entrepreneurship carry the day in the Middle East, where dairy and other commercial ventures are regularly developed by local entrepreneurs. Little research has been carried out to our knowledge on venture capitalism and entrepreneurship among pastoral peoples.

In market-integrated societies, research is needed on the actual processes and procedures by which exchanges are effected. Local systems of credit, sources of cash loans, credit against production (or futures) are all fundamental to the pastoral system of production and must be accounted for if one is to make suggestions for planned change. In many respects, stock raisers in the Middle East increasingly resemble their counterparts in the United States, Australia, New Zealand, and Argentina. They are becoming mobile ranchers.
Informal or nonmonetary exchange relations may paradoxically be increasing in significance among market-oriented producers. The requirements of security often depend on strengthened ties of family and friendship. In West Africa, also, such ties have been of great individual significance in the conduct of long-distance trade and sale in remote markets.

sources of inequality and social segmentation

One of the costs of development, planned or otherwise, is a near universal tendency for internal differentiation and growing disparity in standards of living. In its simplest terms, this process reflects the fact that in circumstances of rapid change some people are better able to cope than are others. One of the not so hidden costs of economic development is the social cost of inequality. Households unable to sustain themselves within pastoral systems too often become squatters on the periphery of other productive systems and settlements.

Intelligent planning should be based on the realization that the costs and benefits from change are differentially experienced. The disenfranchised and poor among some pastoral populations may not be as evident as among farmers and urban dwellers because the destitute — unless engaged as herders — cannot simply hang on; they must leave the system. This is particularly true, we hypothesize, among commercially oriented herders.

As commercialization proceeds, one of us (Bates 1972) has shown a corresponding increase in differential access to critical resources such as monetary credit and pastures. Absentee ownership of the flocks, furthermore, isolates the active herders from much of the decision-making. Politically, as well as economically, decision-making is increasingly centralized. The way this relates to political change in pastoral areas has only recently been studied, and much remains to be discovered (Glatzer 1977).

pastoralism and development in regional perspective

One of the striking lessons of research in the 1970s is that the most productive efforts have focused on behavioural issues rather than definitional approaches or problems arising from ideal types. Instead of attempting to define what a region is or suggest a scale appropriate to all studies, we emphasize the reasons for regional approaches.

Perhaps the most basic reason is biological. The study of demographic processes and population dynamics requires the delineation of a breeding population, and in most herding groups this will include people involved in pursuits other than pastoralism; it will require defining a regional population. Furthermore, the discovery of demographic processes among pastoralists requires comparison with other populations. Rational development planning must be based on an understanding of demographic processes. Changes in birth rates, longevity, mortality among children all have important social and economic correlates. Moreover there is reason to expect that changes in distribution of wealth, labour demands, and the like will be reflected in the vital rates of the population. So far there has been surprisingly little demographic research on pastoral populations (Irons 1979a, 1977; Henin 1969).

Likewise, planning for development cannot proceed without an understanding of the background beyond that of a local group. All pastoralists, as
far as we know, have histories of regularly dealing with other peoples and of choosing among productive strategies. A diachronic study of adaptation requires a scale large enough to account for group interactions, changes in land use, and settlement. Moreover, it is the specific political history of a region that, as much as any set of physical environmental constraints, shapes a complex set of land uses. This is evident throughout the Middle East where the significance of political relations for an understanding of local productive systems is evident (Hutteroth and Abdulfattan 1977).

Rational economic planning, be it to increase food production or to raise per-capita income levels, has to comprehend supracommunity patterns of capital accumulation and deployment. Urban centres are more than market sites to be visited by pastoralists. Trading and administrative centres structure much of the land use in the hinterlands. This of course is one way of defining a region. Although nomadic groups may be removed from the centres with which they trade, they are nonetheless integrated within the economic system. They are specialists in livestock for consumption by other groups, and their integration is immediate and direct. Market articulation in some parts of East Africa may not be as close as in the Middle East or West Africa, but nonetheless surplus livestock produce is exchanged over a wide area, and these exchanges are another kind of regional integration.

Changing technology and capital deployment go hand in hand. Innovation in technology never happens every place at once. Technological innovation in contemporary society involves great expenditures, whether of private capital, bank credits, or government funds. Usually the source of such funds is centralized; however, the technology that such central funds deploy affects a much wider area. Technological change affecting one sector of an economy almost inevitably affects other sectors. Thus, the development of cash cropping can seriously interrupt pastoral exchanges with farmers for food, interdict migratory routes, or adversely affect access to water.

Almost everywhere there has been deterioration or breakdown of traditional partnerships between pastoralists and other producers. The breakdown takes many different local forms. In the Middle East, for example, most pastoralists today conduct their trading and marketing themselves or through entrepreneurs from their own group. The relationship is increasingly that of straightforward commerce. The marketplace itself has a new significance for many herders who come to do more than sell a few animals against next year’s supply of grain. They come to engage in active, entrepreneurial trading going beyond animals and animal produce.

In East Africa, it is a real question to what extent pastoralists are similarly caught up in entrepreneurial speculation (Schneider 1974). To the extent that traditional exchange relations with farmers have been disrupted, pastoralists are forced to deal directly with unrelated suppliers — for example, remote trading posts with supplies of grain, salt, cloth, and other needed goods. Previously, such items became available through kin, very often affines, spread over a wide area. What is happening now is the centralization of exchange relations increasingly mediated over the counter of the trading station.

Research relevant to planning must be cognizant of the way in which the organization of exchange relations is being modified. No longer is it possible to sustain for analytic purposes the fiction of pastoral societies as distinct from others (Bates and Lees 1977; Salzman 1978; Sandford 1977a,b; Swift 1977). At the same time, development planning must build on an awareness
of these changes. In the ecology of integrated systems, it is commonly recognized that increases in productivity in one segment of the system are accompanied by decreases in productivity of other segments of the system. This is not a prediction of failure but a reminder that increases in productivity entail costs, and if these are to be shared, then a considered and even-handed approach is called for.

Contingency planning is a necessity because unexpected problems or costs are inevitable. Too often, development planning utilizes ecosystem equilibrium models, whereas stochastic models are more appropriate. As we have noted, both rangelands and the strategies of the people who utilize them are subject to sudden and discontinuous change. They are not in equilibrium except on a short term. Great care has to be taken that gains in productivity are real rather than simply apparent. Often the benefits of development are calculated without respect to other sectors of the economy. We argue that if the development of agriculture, for example, involves irrigation of lands formerly used for herding, then the loss of the pastoral productivity must be subtracted from the anticipated gains in the farming sector. At the same time, the conversion of extensive pastoralism to intensive feedlot husbandry involves costs to the larger system as well.

Two points are involved. One is that planned change may marginalize groups of people or segments of a population by simply excluding them from the advantage being extended to others. Health development and education efforts frequently take this form, with some benefiting directly from clinics and schools while others are largely unaffected. Thus, some people remain in the shadow of development, so to speak. This is benign neglect in contrast to our second point, which is change benefiting some at the expense of others. In the agricultural sector, individual households or entire villages may benefit from new technology at the expense of their neighbours. In the Middle Eastern pastoral sector, similarly, intensification has created a new class of motorized ranchers. At the same time, a fairly constant animal population is being managed by fewer and fewer households. For some, and these are often pastoralists, the consequence of development is poverty. This is so in the camp group and even within the household. In Iran, hired shepherds are emerging as distinct social classes without their traditional ability to increase their own flocks and establish themselves independently.

Within the household, men and women can be differentially engaged in the development process. In East Africa, among Jie and Pokot, for example, the traditional role of women in managing and inheriting farm plots has been disrupted by the extension of credit to men for the acquisition of farm equipment. Differential educational exposure as well as involvement in development can exacerbate inequities or create new ones in the sexual division of labour, especially where the application of new technologies and hardware is involved.

concluding observations

Our concluding observations return to the idea of a handbook and what it might help accomplish for research on pastoralists in the 1980s and beyond. Our first point is that neither a cookbook nor a catalogue is needed. Instead, a handbook should act to direct attention to urgent areas of research on herders in the contemporary setting. We see this as a period of intense
development of arid and semi-arid areas. Throughout these lands, pastoral peoples are becoming increasingly marginal.

A major contribution of this handbook might be to encourage research such that the knowledge and the experience of pastoralists in managing fragile environments become available to developers of these areas. Another contribution might be to encourage students coming into anthropology to see the enormous impact development is having on the people anthropologists and others traditionally study. A new focus is required. Among professionals we hope the handbook would help further communication and help pull together research being conducted in many parts of the world.

In this respect, we as authors fully realize our own limited perceptions, largely confined to East Africa and the Middle East. A fully developed handbook would have to encompass other parts of the world where development is in full swing. Throughout, we have urged a regional perspective on pastoralists and the problems they face in the context of development and changing economies. A regional approach is not a search for typicality or homogeneity. Rather, it is a focus on the organization and integration of functional diversity — a framework singularly appropriate to the understanding of such a specialized endeavour as livestock management.

discussion

Hopcraft: You have talked of the maintenance of usable plant cover. I argue in my paper that in communal grazing each herder aims almost exclusively to get the maximum benefit from existing pasture. Pasture maintenance and improvement are not rewarding, because the individual can't protect the improved grazing from others. The mix of grazers and browsers is chosen to exploit what plants are available. This would result in an appropriate balance between stock and plant populations were it not that overgrazing by all species selects for inedible plants or those with inaccessible leaves. Thus the result is a thorny, impenetrable thicket. In the case of firewood trees, selective cutting reduces the most useful plants. The result, again, is the expansion of the thicket species.
the failure of pastoral economic development programs in Africa

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A map that marks off the high incidence of livestock in Africa delineates a giant figure 7 across the face of the continent. Starting in Senegal, the figure sweeps across the arid interface between the Sahara and the tropical forest all the way to Ethiopia and Somalia and then boldly down the east—centre of the continent to the southern tip. In all this region, the stock-keeping peoples have mixtures of cattle, sheep, and goats, occasionally supplemented with camels, donkeys, and horses.

Animal husbandry is one of the major productive enterprises in Africa. "There are over 100 million head of cattle south of the Sahara. They form a tremendous natural resource which is intimately linked with the way of life of the people who own them" (Creek 1972:27). The FAO (Food and Agriculture Organization) annual report (FAO Production Yearbook, 1977:Table 80, 81) indicates nearly 140 million cattle and 230 million sheep and goats on the continent for 1975. Brown (1971:94) estimates that half of the total land area, between 1300 and 1600 Mha, is devoted to livestock, and he estimates that 50 million Africans — 15% of the population — are dependent either wholly or largely upon livestock (Brown 1971:74). The estimate is reasonable; it means that there are about three head of cattle and about five sheep or goats for each man, woman, and child among those who are significantly involved in animal husbandry.

These data indicate a massive enterprise devoted to the production of an essential ingredient for human nutrition: protein. Yet the actual production of food is scant. Slaughter rates rarely exceed 10% of the cattle numbers in areas of livestock production. In East Africa, slaughter rates constitute 8.2% of the cattle on the hoof; in West Africa, the proportion reduces to 7.4% and in southern Africa rises to 12.8%. Carcass weights range from a low of 90 kg to a high of 233 per head of cattle. Again, the highest figures are in the southern part of the continent, averaging around 180 kg, as against 120 in East Africa and 113 in West Africa. These slaughter rates and carcass weights produce 10 kg beef/head of live cattle in East Africa; 7 in West Africa and from 10 to 30 in the South.

Milk production figures are no more encouraging. Dyson-Hudson and Dyson-Hudson (1970:111) estimate that about a fourth of the Karamojong adult cattle were lactating cows. The FAO data indicate that such a

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1 This paper was circulated as background for the meeting and is published here for the first time.
proportion is rarely achieved: 23% in Uganda, 24.7% in Mozambique, and an astonishing 40.2% in Swaziland, but more usual figures are between 10 and 14% and in Rhodesia dip to 2.2%. Milk yields per lactating animal vary widely, annual yields ranging from 250 to 600 kg/cow, except in European-dominated areas, where special dairying operations raise the yield to the order of 2000. The Dyson-Hudsons' data (1970:113) indicate that each lactating animal produces roughly 350 kg for human consumption. (The average milk production in the United States is 4000 kg.)

In summary, beef production in Africa in 1975 ranged from less than 1 kg/person to a maximum of 42; mutton and goat meat ranged from zero to 26 kg and liquid milk from nil to 100 kg. Except for small countries, almost totally devoted to livestock, the total annual beef and mutton production rarely exceeds 15 kg/person and of milk, 20.

The land devoted to pastoralism in Africa is not suitable for farming. A century of increased pressure on the African resource base has pushed agriculture into most of the land that is arable on a sustained basis without irrigation. As the debacle in the drought- and famine-stricken Sahel in the early '70s dramatically showed, much of this agricultural invasion was ill-advised. Until markets for specialty crops make an investment in irrigation economically feasible, there will be no massive development of intensive agriculture.

Neither colonial rule nor postcolonial economic development programs have improved the economy of pastoralism in Africa; instead, those actions that were initiated have been deleterious to the pastoral peoples and their animal husbandry. Most who have been in authority, whether African or European, have felt that cattle pastoralism should be discouraged or eradicated and have fostered the transformation to agricultural pursuits wherever feasible. Such schemes as have been formulated to serve the African stockholder have, almost without exception, been ill-conceived and ultimately destructive to the land, the livestock economy, and to the pastoralists themselves, however well-intentioned they were.

In this paper, I want to review the programs that have been promulgated over the past 50 years and to indicate why they have failed to meet the needs of a livestock industry capable of adequately serving the people. I have made a preliminary search of the literature dealing with efforts to cope with the problems of pastoral economies in Africa. So far as I know, nobody has made this effort — and perhaps for good reason. Discussion of programs is scattered in a literature that is heterogeneous and often ephemeral; the usual guides are of little use and indexes often irrelevant. For these reasons, I cannot claim that the investigation is exhaustive, but I think it fairly reflects the realities of economic planning for the African pastoral economy.

an overview of pastoralism in sub-saharan africa

Over the centuries, tribal peoples throughout the continent have utilized the arid and semi-arid lands to serve their purposes by herding animals that feed on natural vegetation. In the process, they have not only evolved the

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2 I am indebted to Walter McCall for his conscientious help in ferreting out information on this and related topics.
technical understanding necessary to this mode of economy but also devised
the social institutions that are equally crucial to this difficult mode of
production. The details of pastoralism vary from tribe to tribe, but some
general features characterize most tribal African stock production:

- The animals kept are cattle, sheep, and goats in various proportions.
  Cattle are the most important in shaping life patterns, even when they
  are not the most important economically. Camels are important only
  in a limited area in the northeast.
- The pastoralists (with a few exceptions) are without horses and herd
  their animals on foot.
- The animals are exploited both for their meat and their milk (and
  sometimes blood is taken from live animals), but the relative
  importance of beef and milk varies from region to region.
- Cattle graze on arid lands that could not sustain agriculture with any
  degree of profit, so that pastoralism may be considered the highest
  economic use of the land.
- The rainfall in these lands is low, is extremely variable from year to
  year, and is spotty and variable in its distribution. As a result, the
  pastoralists must move their animals over wide areas in search of
  food.
- Grazing land is recognized by pastoralists as a public resource
  available to all stock owners in the community; only where land has
  been under cultivation are private rights recognized. The same applies
  to natural water sources, though access to dug wells, where they
  occur, is often limited to those who have created the facility.
- Animals are privately and individually owned, and the acquisition and
  husbanding of livestock is a measure of the individual's economic and
  social competence. These rights are in some degree invaded by the
  claims of the larger kin group upon the stock of its members so that in
  some societies the "owner" is viewed more as a custodian of the
  herd, with the basic right of disposal and the duty to care for the
  animals. These rights are also to various degrees impaired by the
  rights held by the other family members — rights that the owner
  cannot lightly brush aside in the management of the livestock.
- The animals play a significant role in the social life beyond their
  economic function, serving as prestige markers and social currency in
  the formation and reinforcement of social ties of all kinds (of which
  bride payments may be seen as prototypical). This means that the
  animals are not merely an economic resource to the owner but also an
  essential ingredient for the maintenance of social ties and obligations.
- Though cattle and other animals figure prominently in the ritual and
  belief systems, cattle are never considered sacred; rather, they are
  perceived as a productive resource with economic functions, as
  Stenning (1963) has emphasized.
- The care of livestock is normally the responsibility of the men, though
  women often milk animals and have special rights to them. This leads
to an overwhelming tendency in these societies toward masculine
  unity in the social structure and to patrilineal rules of descent and
  inheritance. This probably relates to the natural hazards of herding as
  a pursuit, especially in those areas where warfare and raiding were
  endemic.
There are, of course, also important differences among pastoralists. The major ones are the degree of dependence upon livestock, the political structure in which they are involved, and the degree of assimilation into the modern economy. With respect to the first, there are a few who depend entirely on animals. Most pastoralists, however, do some farming, the proportion of energy devoted to it varying widely. In some groups, animal husbandry plays so minor a role that the members can no longer be considered pastoralists.

When I speak of pastoralism, I am concerned with those whose economy is dominated by animal husbandry, in the sense that their life patterns are basically set by these requirements. Most pastoralists traditionally had little or no political organization, but some were organized into elaborate nation states. Thus, in the South, nations like those of the Swazi and Sotho, and, in the lacustrine area, people like the Watutsi, lived within political systems that integrated agriculture with pastoralism.

Finally, most pastoral people, especially those who are heavily dependent upon their animals and those who have little or poorly developed political systems, are remote from Western influences, have retained most of their traditional culture, and have minimal involvement with the market economy.

a review of development schemes

For the past half century hundreds of separate schemes and plans have been formulated and initiated in Africa in an attempt to "solve" the pastoralist "problem." In this review of development plans and programs, I have found it useful, if sometimes rather arbitrary, to divide these efforts into four categories: those aimed at altering the environment, those directed toward improving the livestock, those that would change the characteristics of the pastoralists and their native institutions and values, and those that provide new economic and marketing facilities.

environmental alteration

Perhaps the most obvious solution to the problem of arid-land pastoralists is to dig wells to provide water. The evidence suggests that this solution universally not only fails but exacerbates the pastoralists' situation. Essentially, what happens is quite simple; under native practices, pastoralists hold back their animals from the wetter areas so as to keep the grass in reserve for the dry seasons. "The concern of a stock herder is to delay as long as possible resorting to permanent wells, not so much for fear that the wells will be exhausted, but to preserve the limited grazing within range of the well" (Baxter 1966:116). Digging wells breaks down this pattern of economizing.

Riesman (1978) noted that among the Fulani of Upper Volta and (quoting Bernus) in Northeast Tahona of the Illabakan territory, where the area was invaded by Fulani and Tuareg, the pastoralists settled near the well, overgrazed the area — the practice ultimately resulting in the desertification of the area and its abandonment. Results were similar for a World Bank project in Tanganyika in the 1950s with 20—30 surface water schemes, 15—20 pipeline schemes and 25—30 boreholes (International Bank for Reconstruction and Development 1961). UNESCO (1977) described similar
occurrences in Senegal, and, across the continent in Somalia, Swift (1976) found the same. Cruz de Carvalho (1971) found that the scheme to improve watering sites resulted in an increase in land claims so that Ovambo nomadic pastoralists of Southwest Angola lost both watering points and grazing land and that ecological deterioration later caused loss of grazing capacity. The ultimate irony in this situation was that as a result of localized overgrazing, the new holders of livestock had to adopt the traditional pastoral techniques.

I have no indication of any instance in which the use of wells has had any positive effect; yet the 1974 Somali Democratic Republic, in its 5-year development program, planned 300 deep wells and 100 water stations (Somali Democratic Republic 1974); in 1973 Rwanda planned to construct 80 water stations (Rwanda, République de, 1973) and Mauritania, 250 wells in 1970 (Mauritanie, République Islamique de, 1970). I do not know whether these plans materialized.

Efforts to improve the land directly are rare and generally falter on inadequate return from a high investment cost. Chief among such efforts is clearing brush for tsetse control. Thus Deshler (1964) discussed the Uganda governmental effort to expand the Dodos' grazing area in 1945–50. Temporary stock increases created a worsened animal overpopulation situation because by 1960 the cleared area was reinfested. The Uganda government also initiated clearance programs in South Angola (International Bank for Reconstruction and Development 1962) and in Bunyoro in conjunction with a ranching scheme.

Control of grass-burning practices can also lead to disaster. Baker (1975a) reported that a prohibition on burning in the Karamoja reduced the nutritional value of dry-season grazing, increased tick infestation of the tall unburned grass that spreads East Coast Fever, and caused a growth of bush that brought about an invasion of tsetse fly.

Curtailing grazing is another way to improve the land and halt the destructive effects of grazing, and the most obvious way to do this is to initiate a stock reduction program. Only this kind of program does not work, as a Swaziland governmental report says in a straightforward manner: "Destocking has proved to be impracticable wherever it has been attempted" (Swaziland, Government of, n.d.:65). Baker (1967) discussed some of the difficulties among the Karamojong and, after briefly reviewing destocking programs in Tanzania and Rwanda-Burundi as well as in the Karamoja, concluded: "Destocking expresses a real issue in unreal terms" (1967:240). Even culling programs to eliminate the weakest members of a herd proved unworkable among the Karamojong. "This scheme was designed to net those animals too old or weak to be sold at the markets but which still competed with younger stock for grazing. There was resentment at being forced to give up animals without choice which the authorities attributed to the general malaise that 'there are many improvements... the Karamojong will find them all incomprehensible' whereas, in reality, the herders chafed at being forced to accept 7 shs [$1.00] per head and considered the scheme an attempt to deprive them of their cattle" (Baker 1975a:198).

Stock reduction schemes do not work because they operate on fiat, creating resentment and antagonism among a traditionally independent people, because they cannot be equitably applied within the local social structure, and because, even if they are temporarily successful, the number of animals will rapidly return to the previous level, unless there is continued close policing.
Another way to control grazing is to establish a "block system." The tribal territory is separated into units or blocks and the pastoralists are forced to use them successively so that each block has a period of "fallow" in which the grass is rejuvenated. The scheme has been used in Kenya among the Pokot and the Samburu. Spencer (1973) has given an eloquent description of the failure, but I shall resist the temptation to quote in extenso. However, I shall merely repeat the expression of some of the more cynical European observers, "that the severe drought between 1959 and 1961 had done more to restore the balance of nature than nine years of grazing schemes."

animal improvement

Three major forms of animal improvement have been tried: disease control, breeding, and culling. Of the three, the first is most frequently reported. It has regularly met with acceptance by the pastoralists and has often led to dramatic increases in the numbers of animals. The result of this success has, unfortunately, most often been disastrous, for the decreased mortality quickly exacerbates problems of overgrazing. Riesman (1978) reported this for the Fulani who, according to van Raay (1975), readily accepted this program so that it led to cattle overpopulation that worsened the 1968–74 drought in the Sahel. Bernard (1972) reported similar results among the Meru of Kenya; Deshler (1964) among the Dodos of Uganda. The International Bank for Reconstruction and Development (1962) supported a disease control program among the Karamojong, with which a marketing program was to be established. Baker (1975a) described the failure of the marketing efforts and the overgrazing that resulted from the program — a failure that worsened conditions among the Karamojong. The United Republic of Cameroon (1971) decided to "stabilize" the disease control program as a result of the erosion that resulted from increased animals.

The reports of breeding experimentation are less conclusive. Those researchers that report any results indicate that the program was of inadequate scale to be effective. Mortelmans and Kageruka (1976) indicated that the program was successful in Zaire only on the large ranches. Much earlier, the Nigerian Livestock Mission (1950:17) reported that efforts were too scattered to have been effective. Riesman (1978:63) claims that the effort among the Fulani of Upper Volta was also on too small a scale to be effective. Swaziland (1973:55) also found that selective breeding, which had been part of its earlier program, was not practiced in most areas. Baker (1967:48) reports that productivity improvement failed in the Karamoja because of small scale and inadequate cooperation.

Culling is less an aspect of breeding control than part of a destocking program. As such, it is generally resented by the pastoralists, as Spencer (1973) reported for the Samburu of Kenya. According to Baker (1975), payment for the culled animals was so low that the Karamojong were resentful and uncooperative. The Dyson-Hudsons (1970) gave social reasons for resistance to culling.

policies directed toward pastoralists' behaviour

A third set of solutions strike at the behaviour of the stock keepers themselves. Both African governmental officials and external agents want somehow to change the character of the pastoralists — to make them over
into something more like farmers or townspeople. The urgent desire to eradicate pastoralism entirely was long ago expressed by Shaw and Colville (1950:36–37):

There can be no solution of Northern Nigeria’s agricultural problem so long as the cattle population remains divorced from its soil; so long as a race of nomads can move those cattle from fly to fly-free country at will, with all the attendant risks of spreading both animal and human disease; so long as they can operate a selective method of grazing that is endangering the herbage and soil of wide areas; and so long as they and their cattle can continue their depredations onto the farms and the water supplies of the settled agriculturalists. No matter how aesthetically attractive the race may be, or how deep its roots in history, they and their cattle must become settled if the large issues in Nigeria are to be solved in the interests of the Nigerian people. There can be no question of their preservation as nomadic cattle owners, owing loyalty neither to the soil nor the Territory. The aim of policy should be their absorption into the country’s agriculture.

Though such strong statements are no longer expressed, the sentiment is reflected in less bold forms, as for instance, in a recent Swaziland governmental report that the government “must transform [the pastoralists’] attitude toward cattle” (Swaziland, Government of, 1973:51). Other efforts to alter the sentiments and institutions of a pastoral people include: efforts to prohibit Maasai from buying cattle and from congregating in military age-sets (Jacobs 1973b); creating communal cattle ownership among the Tanzania Maasai (McCaulay 1976); efforts to change Baila attitudes toward cattle maturity (Fielder 1973); the plans of the Swaziland government (1973), the United Republic of the Cameroon (1971), and the Republic of Senegal (1973) to change traditional practices from subsistence to commercial orientation; decreasing nomadism in Somalia to increase milk and meat productivity (Somali Democratic Republic 1974); efforts to break up Samburu age-sets (Spencer 1973); limiting movement of cattle among the Karamojong (Baker 1975a); education of pastoralists in the Republic of Togoland to change traditional patterns (Togo, Republique de, 1971); eliminating the ritual aspect of cattle among the Herero of Botswana (Vivelo 1977); and banning traditional oaths and use of stock in payment of fines among the Meru of Kenya (Bernard 1972). In only a few cases is there any record of success, and where there is success it generally had unfortunate consequences. Thus Bernard believes that Meru changes contributed to overproduction and overgrazing. Vivelo (1977) believes that the secularization of cattle destroyed the social and psychologic elements in social control and led to the unrest that was expressed in a revitalization movement in the 1960s.

Repeatedly, one finds the pastoralists pushed back from their more productive land and forced into marginal areas. Lofchie (1975) showed that the famines of the early 1970s in West Africa were less a product of drought than of politics. He pointed out that the colonial era brought a dual economy of export crops and subsistence agriculture and that economic development was concerned only with the furtherance of the former. These policies rendered peasants, to various degrees, dependent upon wage labour, discouraged peasant production from direct competition with the commercial farming sector, and used pricing policies that “encouraged the shift in
land-use patterns away from food crops to export items" (Lofchie 1975:563). What Lofchie did not say was that this process had a kind of domino effect: peasants after giving up land to commercialized production invaded the poorer lands that had been a part of the pastoralists' domain and this in turn forced the stock owners into the use of still poorer lands.

This is a recurrent phenomenon in West Africa, where Fulani nomadic pastoralists have been forced into ever drier regions. MAB Technical Notes (UNESCO 1977) reported "The withdrawal of pastoralists toward the most arid regions which the farmers could not exploit, is largely responsible for the vulnerability of livestock breeding and for the disastrous effects of the recent drought in the Sahel." The pastures they had used during the dry season were gradually being lost to them as former stubble fields were cultivated to cotton, rivers planted to flood-retreat crops, etc. "It even happens that modern agricultural developments suddenly cut off the most valuable pastures, which had always been the livestock breeders' last resort."

Frantz is the single close scholar of African pastoralism who does not see this as a problem. According to him, sedentarization was encouraged by the Nigerian government and has been highly successful. He noted that the pastoral populations have become "incorporated into a trans-ethnic system of social relations" (Frantz 1975:346); non-Fulani live among other ethnic groups, whereas many Fulani have given up cattle pastoralism altogether; some Fulani have in fact taken up land formerly held by farming groups, and, although full-time nomadism and transhumance continues, it has been on the decline. He reported that cultural fusion among the ethnic groups was taking place. But the area to which Frantz's extensive research is applicable is atypical of pastoral economies of Africa in that it is less arid and more hospitable to a relatively intensive operation (Frantz 1978:102) and had been underpopulated. That this favourable adaptation is not generalized to the more arid portions of West Africa where pastoralism is practiced is indicated by Horowitz (1975) and Riesman (1978).

A similar problem arises in Kenya where some Maasai lands have been converted to wheat production, with potentially highly explosive results.

High potential, dry-season pastures, and water sources play an indispensable role in making the entire yearly cycle of Maasai transhumance possible; yet it is precisely these centres for which competition (with outside forces) is now the highest. The colonial formation of commercial ranches in the Rift Valley and in northern Tanzania represented only the initial erosion of Maasai access to these areas. The regions of Ngong and Loitokitok contain well-watered and fertile land and thus were obvious targets of agricultural expansion. This fact, combined with the opening of these highland areas to individual freehold title, resulted in a train of events now considered deplorable by Maasai. Maasai gained individual titles, land values escalated, and appreciable land was sold to outside cultivators with greater market sophistication and awareness of the future value of those regions. Today, Kikuyu dominate the Ngong area and, along with Chagga, control much of Loitokitok, effectively removing these regions from pastoral use, as well as from Maasai hands. Similarly, wheat schemes were formed on high potential lands in both Kajiado and Narok districts, commercial ventures now dominated by agrocorporations that bring capital into the region but at the expense of pastoralism (Galaty 1970:159–160).
This invasion of agriculture into traditionally pastoral territories under the best circumstances involves a "mixed economy" of farming and stock keeping. Such mixed operations are characteristic of most traditional production economies, and the people have usually optimized the relationship between the two strategies. Support given by governmental policies introduces an exogenous element into the situation with results that are often not ecologically optimal. Pastoralists traditionally use some land in their pastoral pursuits that would, of itself, yield reasonably good crops. Though such small portions of land might be more productive as farmland than as grass and browse for livestock, taking it from pastoral use may have deleterious effects on the total range available to the people and may reduce the overall production capacity. Such superior quality land within the pastoralists' domain is a fail-safe mechanism. This is a point that has been made by Jacobs (1973) with respect to developments that have taken place in Maasailand.

Of all the efforts to change the patterns of pastoral behaviour, the most appealing one to many Western development economists is to establish ranches, fenced or otherwise demarked tracts held in fee-simple title by individuals or groups. This accords with Euro-American notions of land holding, farming, and business operations and appears as simply being the right way to do things. That it is destructive to the native way of life is at best viewed as irrelevant, at worst as desirable. That, if successful, it would pauperize nine-tenths of a tribal people in the area is conveniently overlooked. These social considerations aside, such a plan simply does not work as an efficient means of utilizing the natural grasslands under conditions that exist in arid portions of Africa. (I am not here examining instances where Europeans under colonial rule have expropriated land and established commercial ranching operations. To the degree that these have been effective, they have utilized exceptionally favourable conditions and have, of course, shown no regard for the welfare of the indigenous people.)

There are five areas known to me where some kind of ranching scheme has been initiated, though in no instance is there a complete and detailed analysis of the activity. One of these is the Markoye Ranch. Riesman (1978:63) said of the Markoye Ranch developed as a demonstration by AID for the Fulani:

The ranch in no way represents anything that the Fulani would reasonably learn from. They did not need to be told that the grass would grow if cattle didn't eat it, and the fencing of the range was not only prohibitively expensive but contrary to Fulani custom. Finally, the Markoye Ranch was not extensive enough to overcome the spotty nature of Sahelian rainfall. . . . Yet had the ranch been much larger it would certainly have become the target of much anger on the part of local people.

Stenning (1959:237), discussing ranching plans in West Africa much earlier, said that ranching:

. . . has long been believed to be more practical [than mixed farming] in Bornu; this view had an early if ill-founded demonstration in the efforts of Speed and his 'African Ranches, Ltd.,' and has been suggested, although with reservations, by the authors of a recent report on Nigerian Livestock.
On the assumption that such ranches would be in the hands of the Fulani themselves, Stenning outlined the problems inherent in utilizing the existing social organization in such a program. Though he found many difficulties in such an adjustment, he did not find it impossible. Ranches have not been developed there or elsewhere in Africa using native social structures.

One of the most ambitious ranching efforts was developed in Western Uganda. Doornbos and Lofchie (1971:166–167), in an article appropriately titled "Ranching and Scheming," have described the development:

The Ankole Ranching Scheme is a project assisted by the United States Agency for International Development (USAID) and undertaken by the government of Uganda to promote commercial cattle ranching in southwestern Uganda. The declared objective of the scheme is to construct more than one hundred cattle ranches, of several thousand acres each, and to place them in the hands of competent ranchers who will be able to undertake large-scale beef production on an economically viable basis. The highly complex scheme has involved a wide range of activities such as tsetse fly eradication projects, the construction of roads, bridges, and valley tanks, perimeter fencing, pasture research, and the creation of an experimental cattle breeding station adjacent to the ranch area proper. As such, the ranching scheme has involved a host of governmental decisions about a wide range of economic, technical, and, due to United States financial involvement, foreign policy matters. As of 1968, the scheme had not yet been completed, and only forty of an anticipated 125 ranches were allocated.

Doornbos and Lofchie showed how the political elite of Uganda took over control of these lands and succeeded in establishing themselves as absentee landowners over large tracts of Uganda's rich grasslands. The implications for the economic conditions of the local pastoralists need no comment.

Cruz de Carvalho (1971) has examined the relationship between ranching and native production methods in Angola, where European operated ranches are in competition with traditional pastoralism. His detailed examination argues for the traditional methods, claiming a relatively low land : animal ratio, a high reproductive rate, a high slaughter rate, excellent female : male and young : old ratios, and a close adaptation to the environment. He noted many reasons that the Africans refuse to engage in ranching: social considerations such as established patterns of reciprocity and limitations on the privatization of rights to land and other resources and exchange agreements; environmental ones such as the diversity of grazing land that must be used in the course of a year; economic ones such as the impossibility of accumulating the capital requisite for such a program. He concluded (1971:28–31):

This skepticism appears to be confirmed in the experience of some of the ranches already in existence. While a great majority of the ranches are recent, clear signs of deterioration of grazing lands can already be seen in the older ones. For example, in 1968–69 there were 22 ranches in the Cunene Region, holding 33,775 head of cattle and occupying 945 square miles. Although the ranches had an average ratio of 17.7 acre–beast — higher than that for the communal grazing lands of the traditional sector (15.63) — more than one-third of the ranches also had to use the African communal grazing lands.
At least three ranching schemes have been initiated among the Maasai: individual and group ranches in Kenya and Ujamaa operations in Tanzania.

The development of Maasai ranching in Kenya was preceded by the alienation of land during the colonial period in the Ngong and Loitokitok areas. Maasai fears of this development, their concern with potential erosion of their lands under the new farmer-dominated Kenya government, and perhaps the memory of the 1961 drought, with its decimation of their herds, made this usually intractable people willing to accept extensive changes in their social arrangements.

The immediate response was the establishment in 1965 of 28 individual ranches in the Kaputei area, comprising 56,000 (~22,400 ha) of its 806,000 acres (~344,000 ha), mostly, if not entirely, allocated to wealthy or influential people (Hedlund 1971). It was as clear to the Maasai as it would be to anyone else that there was inadequate land to divide among all the Maasai, and hence a fear was engendered that many of them would remain landless, or else the units would be too small to be viable. The response was the development of a “land adjudication” program, the formation of group ranches with registered memberships. In the Kaputei area, 14 ranches averaging 47,500 acres (~19,000 ha) and about 100 families were established in the latter part of the 1960s (Davis 1971). Though this registration process was readily accepted by the Maasai, both Galaty (1980) and Hedlund (1971) recognized that the major motive was fear of alternative governmental actions rather than enthusiasm for the proposals. Even the conservative segments favoured land registration and gave limited approval to the group ranch idea, though they would have preferred no internal division to their established sections. As one elder was quoted as saying, “If there is rain in Kenyawa [south Kaputei] and people have ranches there, I cannot move [my cattle] into that place. You educated people want us to settle down, so our land becomes like Kikuyuland [i.e., individually controlled]” (Hedlund 1971:4). Traditional and established Maasai social units were not used as a basis for demarcating these group ranches despite anthropological advice at the time. The Maasai were aware that the group ranches would not always be capable of supporting year-round grazing and for that reason at least the more aware among them arranged to have family members registered in separate ranches so that the patterns of kinship reciprocity could be used as a source of access to lands in other ranches when it became necessary as a result of scattered patterns of rainfall and drought.

The creation of individual ranches has had two major influences; it has established among the Maasai a politically active distinct upper social class (Hedlund 1971), and it has disengaged this group from the normal patterns of social and economic reciprocity that have been so vital a factor in the handling of localized disasters.

The group ranches have not transformed Maasai cattle economy from a subsistence to a commercial production operation, according to Galaty (1980:164–165).

[It does not] appear . . . that the Group Ranches are serving the function of radically transforming Maasai pastoralism from subsistence to commercial herding. . . . Further, it is uncertain that such a transformation could be carried out as a result of grazing and stocking limitations. . . . The Group Ranches are, however, serving as organizational mechanisms
for the improvement of livestock management techniques, through the investment of capital in cooperative facilities such as cattle dips, spray equipment, and marketing, and facilitation of the dissemination of information.

In addition, says Davis (1970:27):

The group ranches have not set up a method by which stock reduction could be developed. Indeed, they are in a Catch-22 situation. If the ranch committee makes no allocation of rights, grazing is not reduced and all share the inevitable disaster; if they do, they must institutionalize social inequality. Do they make allocations to those men who can make the most profit, thereby increasing total income but creating social discriminations? The issue is one for which Maasai have no precedent.

Because the Maasai were, from the outset, apprehensive about the formation of boundaries with limited rights of access, they adapted their own cultural conventions to circumvent such limitations; however, they were unable to stem the flow of others into their areas (Galaty 1980:167–168).

While individual families are often able to move across such boundaries with the agreement of host negotiators, the gradual pushing into a region by several homesteads without such agreement is interpreted as a form of annexation. In the context of the 1960’s and 1970’s, such incursion involves the added threat of loss of the land through adjudication if such ‘facts’ were allowed to stand.

Galaty (1980) examined three instances of armed clashes between sections over issues involving territorial invasion and grazing rights. Each of these outbreaks (in two of which many Maasai were killed) demonstrated that deep-seated traditional affinities continue to influence lines of mutual assistance, and have nothing to do with the boundary mechanisms that delineate the group ranches. He then concluded that any success that has been achieved during the group ranch plan would have been derived despite their existence rather than because of them. At best, the scheme serves to regulate the relationships between the Maasai and the central government, giving them among other things some access to credit and other aids, but it does nothing for the relationships among the Maasai themselves or between the Maasai and their environment.

Apparently the Tanganyika colonial administration endeavoured to set up cooperatives as early as the 1930s, but these efforts failed. President Julius Nyerere endeavoured to apply the concept of Ujamaa (socialist community) to pastoralism as early as 1964 under the Range Development and Management Act. This involved settlement of pastoralists into clustered villages, introduction of crop production, and establishment of communally owned herds. Baldus (1977:40) reported:

Twenty Ranching Associations were to be established in the Maasai area. However, up to 1973 only two associations had been registered. Another two had applied for registration and four more were being organized. . . . It became evident, however, that the Range Development Programme strongly influenced by U.S.A.I.D. was too much oriented towards a technocratic-commercial development of a cattle industry. High capital investment to develop meat production was undertaken; but no
consistent strategy was worked out which could have brought about the necessary changes in social structure, the attitudes, and cultural patterns of the Masai people.

A change in policy became evident in 1972 when the authorities started registering the few existing associations as multi-purpose cooperatives and subdividing them afterwards into cooperative Ujamaa groups. This, however, was not a reaction to the above critical remarks, but rather a belated effort to somehow integrate the Range Development Programme into the Ujamaa programme.

Baldus (1977) said that the government tried to win over the Maasai with such incentives as housing and permanent water supply but met with little success. Efforts at coercion in the "domestication" of the nomads evoked criticism as being counter to the principles of self-determination. Even concessions allowing the Maasai to keep private ownership proved unsuccessful.

In 1973, with substantial support from the United States and the World Bank, a large-scale program for the establishment of state ranches was launched. These ranches were to be cooperatives rather than communal. Baldus (1977:42) said:

... these Ujamaa ranches are to be managed on a cooperative basis. The voluntary participating members are to bring in their own private cattle and contribute their labour. Herds will be held as communal property. ...

The main problem, that of introducing changes in the herding practices of nomadic pastoralists, is not touched by this programme. ... Only in the case of a few Ujamaa villages have the members decided to take their own cattle for building up communal herds. Thus, most of the cattle in the villages do not belong to the cooperative sector as yet.

Even in those cases where Ujamaa villages were supplied with communal cattle subsidized by the government to serve as a basis for collective ownership, "the motivation of members was negatively influenced by this government assistance which runs contrary to the principle of self-reliance: the development of the modern herd takes place in isolation from the traditional sector and thus does not contribute towards the transformation of the traditional system of keeping cattle which members continue to practice" (Baldus 1977:43).

Baldus (1977:44) commented: "It would be better if while still retaining some forms of nomadism an attempt were made to achieve a gradual transition towards cooperative property and herd management." He (1977:44-45) noted: "the Ujamaa programme had learned a lesson from the failure of the former capital-intensive settlement programme of the early 1960's ... therefore postulated the principle of self-reliance of the Ujamaa villages." He concluded: "The complicated structure of such big ranches is above the technological level and organization and administrative capacity of the pastoralist people and will therefore endanger the economic and political self-determination of the producers which is the government's goal."

In Swaziland, the problem of overgrazing received special attention in an administrative seminar (Presswood 1976). The seminar recommended the establishment of group ranches and what it called Sisa ranches for the
management and upgrading of Swazi-owned breeding stock. It avoided direct confrontation with the issue of overgrazing and destocking programs.

Ranching schemes constitute both the most extensive and the most creative efforts at altering pastoral economies, but each of the instances cited indicates their essential failure. Where individual ranches are created, they inevitably disenfranchise and pauperize the major sector of the population, and, as the Maasai instance indicates, dissociate the ranchers themselves from their own communities. The most ambitious scheme, that of the group ranches in Kenya, has succeeded only by Maasai creativity in circumventing the established regulations — and even then has resulted in bloodshed.

**provision of modern economic services**

Many planning reports express concern over the relation of pastoralists to the market and mention one or more of the following institutional possibilities: improved facilities, abattoirs (including mobile abattoirs), transport, processing plants, feed lots and fattening facilities (International Bank for Reconstruction and Development 1961, 1962; Federation of Rhodesia and Nyasaland 1956; Zambia, Government of, 1971; East African Royal Commission 1955; Sénégal, République du, 1974; Swaziland, Government of, n.d.; Somali Democratic Republic 1971, 1974). Although these reports indicate in many instances that some of these facilities have been initiated, there is usually no indication as to whether their adoption had proved effective.

A recurrent failure of government-sponsored marketing schemes relates to pricing policy. As early as 1956, the Federation of Rhodesia and Nyasaland (1956) reported on the disparity between sales prices for natives and Europeans at cattle sales that caused hostility not only to the marketing program but, by extension, to other schemes. Jacobs (1973b) has claimed that government-sponsored marketing facilities were virtually ignored by the Maasai because both prices and marketing arrangements of native butchers were better. The Karamojong (Dyson-Hudson and Dyson-Hudson 1970) sold to nongovernmental buyers except in very bad years. Similarly, the Teso did not use marketing facilities in Soroti, Uganda (Baker 1967). Bernard (1972) said that the Meru responded to the local hide market established by the local native council in the 1940s and 1950s, but its operation was discontinued because it was only marginally effective. The East African Royal Commission (1955) reported that the Kenya Meat Commission had, in fact, depressed the overall price of meat by establishing arbitrary area quotas, and a similar result, according to Mackenzie (1972; Jacobs 1973b) was brought about by the creation of a monopoly in marketing in Tanzania in the form of the Tanganyika Ranchers Ltd and the Tanganyika Packers Ltd, which drove the pastoralists into the black market. The Somali Democratic Republic (1971) reported that its marketing operations were limited by the inadequacy of the scale of operation, the failure to provide transportation facilities, and the lack of adaptation to pastoralists' native practices.

Marketing schemes frequently involve processing plants. Baker (1967) reported that the canning factory at Soroti failed to compete with local prices; Federation of Rhodesia and Nyasaland (1956) argued that the Cold Storage Commission needed to change its pricing policy if it were to avoid the hostility of native producers, a sentiment also expressed by Colson and Chona (1965) with reference to the Tonga.
Transportation facilities are recognized as a problem in the marketing of livestock by IBRD, which recommended annual investments to improve stock routes in Tanganyika (1961), by the Republic of Cameroon (1971), and by the Somali Democratic Republic (1974). Ansell (1971) noted difficulties in the marketing of Botswana cattle because of the poor roads and the fact that there is only one railroad, which is prohibitive to Botswana sellers. Transport is a major problem.

Throughout Africa, peasant producers suffer from a lack of credit. Thus the World Bank report on Kenya (International Bank for Reconstruction and Development 1975) said that of some 1.2 million smallholders, fewer than 200,000 have access to formal credit, most in the top 20% in farm size, because the administration of credit is imbalanced in favour of the large operations. The issue is an old one, for the East African Royal Commission (1955) said that it was a part of East African colonial policy to prevent the African "from acquiring a burden of unproductive indebtedness." That has made it "difficult for the African to borrow for productive purposes."

If there are difficulties for the African farmers, these are compounded for the pastoralists. Thus van Raay (1975:136) wrote:

Although it may not have been the intention to exclude either nomadic or sedentary Fulani pastoralists, there is little doubt that the government's insistence that farmers control a sizeable acreage of land to be eligible for loans has mitigated against the spread of advanced mixed farming practices among the Fulani pastoralists.

Manners (1962:515) said: "private lenders or banks, of which there are three in Kencho, would be unwilling to accept cattle for security, since these could prove most elusive to a creditor who wanted to seize them for sale" and went on to say that though the government has from time to time launched cooperatives for the sake of hides and skins among the Kipsigis, none has had the backing of the Kipsigis Traders' Cooperative and all have been unsuccessful (Manners 1962). Ruthenberg (1966:49), writing of Kenya, said: "... typical grazing schemes have included provision for loans for investments necessary in culling, castration, rotational grazing, dips, water projects and the like. These all contain provisions that would enforce radical changes to husbandry techniques, including elimination of transhumance." The IBRD (International Bank for Reconstruction and Development 1961) report on the Tanganyika Five Year Agricultural Development Plan of 1956 said that a majority of the 140 submitted proposals were crop-oriented and that the use of credit facilities was generally unsatisfactory because of the limitation on eligibility and the small size. The group ranching scheme established for the Maasai involved legal incorporation that would enable the rancher to receive governmental loans (Davis 1971) and this was one of the incentives for the Maasai to enter into it.

The World Bank report on Kenya (International Bank for Reconstruction and Development 1975:488) found: "... rigid adherence to the use of land as collateral and related credit worthiness requirements obstruct the efficient use of credit" and went on to say:

A concerted program to expand credit use is needed. Credit is required for land purchases, to permit capital reconstruction, particularly for livestock after drought periods. ... But the greatest scope for credit use is
Having more than one wife is common in Maasai culture. The second wife (left) of this Maasai elder is the same age as his son (right). Often, social change occurs — such as the incorporation of pastoralists in group ranches — while other social and economic practices remain.

in lubricating the adoption of improved husbandry practices, especially where fairly radical changes are being promoted.

pastoral adaptability and economic planning

The picture that emerges from this review is one of almost unrelieved failure. Nothing seems to work, few pastoral people's lives have improved, there is no evidence of increased production of meat and milk, the land continues to deteriorate, and millions of dollars have been spent. What is wrong?

The easy answer is to blame the pastoralists themselves; they are too ignorant, too traditional, too stubborn; they do not want to be helped. But that the pastoralists are willing and able to change their ways is easily demonstrated. Those quintessential African pastoralists, the Maasai, re-
peatedly became fixed farmers or predominantly farmers, as exemplified by the Warush. My own work in East Africa has centred on this recurrent phenomenon (Goldschmidt 1975a and elsewhere), and I have given direct attention to it recently (Goldschmidt 1980). Schneider (1979) has called attention to similar events that have taken place under the stimulus of opportunities created by colonialism among the Teso of Uganda, the Kipsigis, and to a lesser extent the Nandi of Kenya. Under such circumstances of natural sedentarization, there is a gradual adaptation of old institutions to new purposes and even occasionally the invention of new techniques for handling social relationships (Goldschmidt 1976).

If the answer does not lie in the pastoralists themselves, it must lie in the planning process. Leaving aside those ill-intentioned cases where prejudice against pastoralists inspired calculated harmful action, I note several basic flaws in planning for economic development. First, planners do not learn from their own mistakes. To see governments plan to make elaborate installations of water holes or to launch stock-reduction programs after these have been repeatedly branded as failures makes one wonder why writing was ever invented. Significantly, those engaged in planning have made no review of their own programs, such as this attempt from the outside.3

Second, there is a consistent disregard of pastoral peoples' own knowledge. The fact that they have made adaptations to a difficult environment that they know intimately does not faze the experts who believe they are armed with superior knowledge. The pastoralists' use of the landscape, especially their exploitation of a range of resources to counter the quixotic character of the climate is especially relevant here. Closely related is the failure to recognize the functional significance of the established social organization and value system of the people themselves. The conquest of areas inhabited by pastoralists requires a unique blend of individualism and cooperation, for which institutions of stock ownership and stock transfers, age-sets, kin groups, etc. have created the necessary motivation and patterns of collaboration. It is an understatement to say that inadequate attention has been given to social factors, for in fact virtually no attention has been given to them. Yet the organization of effort is always an essential element in production and, often, is the crucial element. Technological innovation, in the absence of appropriate social innovation, fails with dismal regularity. In more particular terms, neither fences nor wells can solve the problems of the pastoralists; what is needed is appropriate social devices.

Finally, programs are initiated without coordination. They are in the hands of technical experts, each of whom is concerned only with his or her own area of expertise. There is no effort to relate the actions taken to the full cycle of activities necessarily involved. This is best exemplified by the failure that results from success in stock disease eradication programs, but quite clearly it is a generic problem.

What is needed is a coordinated approach. This means that such technical matters as disease control, land improvement, and marketing operations are to be developed in a concerted, integrated fashion. It means

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3 An earlier, more extensive version of the present analysis was sent to the livestock officer of the World Bank, who rejected the analysis (H.J.S. Marples personal communication 1979): "In my view many of the sentiments you express ... are quite unsupported by the facts." My earnest effort to get citations elicited no response.
that the legitimate interests and aims of the pastoralists, including their use of livestock as factors in their social relationships, are taken into account. I have elsewhere suggested (Goldschmidt 1975a) the establishment of a special livestock credit system that would be coordinated with marketing, stock improvements, and other programs that I believe would induce pastoral peoples to produce more meat for the market and at the same time would reduce the number of animals in the kraals. Whether or not the specifics of that program are viable, it is quite clear, first, that what has been accomplished thus far has not proved to be the answer and, second, that the solutions to the problems inherent in utilizing the arid grasslands of Africa will require a bold, many-faceted approach that is sympathetic to the needs of the native stock owners.
the anthropologist as mediator

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This is a personal account of my work as mediator between the Negev Bedouin and the Israeli authorities during 1979–80. Mediation is practical work that is quite distinct from both applied anthropology and committed anthropology. The former refers to work commissioned by powerful groups, who are often in a position to influence the outcome of studies. The latter term refers to intervention on behalf of weak groups, who presumably cannot help themselves. In my opinion, both applied and committed anthropology are ethically doubtful, because they imply patronizing attitudes toward the people, for both assume that the people are unable to determine their own fate and unable to resist intervention. Mediating anthropologists work with all the parties involved in any particular matter and seek to achieve a workable solution acceptable to all. They assume that the parties concerned possess power and more or less clearly defined aims. I use the term mediator for persons who have an "interjacent commitment" to the negotiating parties (Gulliver 1969:62). Gulliver rightly notes that these are usually also people of influence, with resources of their own, who often take the lead in negotiations. I describe a particular instance of mediation and draw some tentative conclusions.

The dispute between the Negev Bedouin and the authorities is long standing and only came to a head in 1979. Processes never end; so the work is still in progress. Until now it has been successful, in the sense that the authorities and the Bedouin have reluctantly agreed on a policy of resettlement and compensation; the agreement has been embodied in a law, and it is now being implemented. Of course, "there is many a slip between the cup and the lip," but so far the solution seems to work.

The beginnings of this work were inauspicious, as it appeared unlikely that a small group of citizens could induce government to revise long-established policies supported by bureaucratic machinery. I shall try to explain why the efforts of this group, of which I was a member, succeeded. The conclusions may be applied elsewhere. I shall first sketch the social background and then present the case material.

In 1979, Egypt and Israel made peace. Under the peace treaty, the Sinai peninsula was to be returned to Egypt, and Israeli forces were gradually to withdraw. As a result, the Negev, the southern half of Israel, assumed new significance. It is an arid region, with an average annual rainfall of less than 200 mm. The Negev had developed more slowly than had the rest of the country. It provided the empty space needed for army units to regroup and for air bases to be established. It was expected that most of the new
development would be concentrated in the northern Negev, from the Hebron Mountains in the north to the Tsin River in the south. The Be’er Sheva Plain, in particular, was to become a centre for relocated industries and an air base was to be set up there. Land that lay unused, or was not used intensively, was now to be fully exploited, and land values would rise.

A considerable part of the area earmarked for development was occupied by about 40 000 Bedouin. These former seminomadic pastoralists and agriculturalists had, after the establishment of Israel, been confined to an area 1000 km² in the eastern part of the Be’er Sheva Plain. In this enforced settlement only one-third of the population stayed on their own farmland and continued to cultivate it. As no water was available, they grew mostly wheat and barley. In a region hit by drought almost every other year, cereal farming produced little income. Some people dammed up small valleys and grew fruit trees in the water-soaked plots created.

The landless Bedouin could obtain small parcels of government land in annually renewable leases. Of course, on such land, no improvements could be made, and only cereals were grown.

By the 1970s, Bedouin derived only about 10% of their cash income from cultivation. Flocks of sheep and goats, which had formerly been the second major source of income in most households, had declined in importance, and sheep raising was now practiced by a small number of Bedouin who owned relatively large flocks of several hundred head. Most Bedouin men had become wage earners, in factories, farms, and offices, and some had done well in business, mainly as building contractors. And yet the Bedouin remained on their land, cultivated it assiduously, and settled close to their land, in small hamlets of agnates. Only a few moved into town, close to their source of employment. This was the unintended result of government policies toward the Bedouin. On the one hand, the Lands Authority attempted to take over Bedouin land. Since the establishment of the state, it had sought to nationalize all land; it now owns 93% of the country’s total area and still strives to increase its holdings. It has constantly tried to expropriate Bedouin land, in recent years mainly by legal requisition. To forestall this policy, Bedouin settled on their land. They realized the value of the land, especially with the government so anxious to acquire it. By working the land, they maintained rights of occupancy.

On the other hand, many of the Bedouin who found work in town did not hold secure jobs. The Employment Service did not favour them and for some years sought to keep them out of the labour market. Since the early 1960s, however, the Israeli economy has provided more jobs than there are people to fill them, and the Bedouin have profited from the boom, although their limited schooling and vocational training have forced many of them to take the less-permanent and lower-paid jobs. Land provided these people with some basic security. Besides, the government sporadically subsidized Bedouin dry farming, by paying drought compensation (until 1962) or by supplying cheap seeds (from 1978 onward).

The result of this interaction between the Bedouin and the authorities was a stalemate as far as the ownership of land was concerned. Neither the government nor the Bedouin established undisputed rights to the land. For many years they even refrained from taking the issue to court. Only in 1975 did the Lands Authority win some test cases, which are still being contested. Consequently, the Bedouin area was not developed. Although the Bedouin settled, most of them set up only temporary abodes, such as wood and tin
shacks. The authorities considered these to be illegal constructions and occasionally dismantled one. At the same time, it did provide some services to the population, such as schools and health services, and some hamlets even gained access to piped water. Thus, the authorities pursued several inconsistent policies.

In the wake of the peace treaty, the Air Force required three new air bases in the Negev, one of which was to be built in the Eastern Be'er Sheva Plain. Government authorized officials who had hitherto dealt with the Bedouin to make the necessary arrangements. The outcome was a draft law to expropriate an area six times that needed for the air base, and the proposal did not allow the occupants of the expropriated land recourse to the courts. Compensation for the land was to be nominal; however, each Bedouin household, whether it had owned land or not, would be entitled to a fully developed building site in one of seven Bedouin towns to be established in the Negev.

The planners did not consult or negotiate with the Bedouin, and news of the project reached them through garbled newspaper reports. Their anxiety increased as the months passed, and in response they closed their ranks around the tribal chiefs. This new determination was first tested in April 1979, when the Land Authority tried to build a road to Laqia, one of the projected Bedouin towns, which ran through the land of several families. The area had been expropriated, but the Bedouin were still contesting the decision in the High Court. The Bedouin clashed violently with the police, and several persons were hurt on both sides. The public in Israel and abroad reacted sharply, and the government agreed to reconsider the issue.

At this stage, I became involved in the affair. In the early 1960s, I had carried out an anthropological study of the Zullam Bedouin in the Eastern Be'er Sheva Plain (Marx 1967), and I continued to see my friends there. In February, some of my old friends asked me to intervene on their behalf. At about the same time, I was invited to work with a planning team for the Negev set up by the ministries of defence and agriculture and to suggest ways to solve the "Bedouin problem." Armed with these two mandates, I first tried, unsuccessfully, to persuade several of the officials who had planned the expropriation law to shelve the law and to negotiate a settlement with the Bedouin. Then, as a result of extensive discussions with Bedouin and officials working in the field, I worked out a plan that would allow the setting up of the air base and would be responsive to the needs of the Bedouin. This plan was modified in discussions with the members of the Negev Planning Team and finally accepted and published in their report (Wachman et al. 1979: 131–136).

The plan was based on several premises: that only a negotiated agreement was likely to succeed; that the Bedouin should be treated as owners of the cultivated land and be compensated to the full market value of the land in an out-of-court agreement so that the issue of land ownership could be evaded; that, because the loss of land would deprive the Bedouin of their economic base, they should be provided with secure livelihoods and compensated in productive resources, such as irrigated farms, shops, workshops, or taxi licences, of their choice, purchased with the proceeds from the land and commensurate with the average standard of living in the country and not with the income derived from dry farming; and that every Bedouin household should be able to acquire a developed building site in a
Bedouin town. If the compensation received were not enough to pay for the building site, then subsidized loans should be made available. The Bedouin towns were to be large, so that they would provide a full range of services and a variety of employment opportunities; instead of seven small towns, three large ones would be built, with a projected population of 20,000 each.

The Negev Planning Team first got together as an unofficial group of people concerned about the future of the Negev under the new conditions created by the peace. Its members were professionals who, at first, worked on a voluntary basis. The official agency responsible for physical planning, a division of the Ministry of Interior, was not willing to give up its prerogative and tried for many months to boycott the group. As a result, the Planning Team became militant, its members canvassed and persuaded government officials and saw to it that the recommendations were accepted and carried out. As outsiders they could disregard official channels and communicated with officials at every level and in any department. In this way, they succeeded in several instances to create almost unanimous support for their ideas and to isolate the conflicting views of opponents. In short, they acted as a regular pressure group. When, at last, they were recognized by government as the official planning group, and funds allocated to them, they quickly lost their independence and with it their influence.

The conditions under which the Negev Planning Team laboured also influenced its approach to the Bedouin land question. At first, this was just one in a large array of problems, but as the team became more institutionalized and its freedom to negotiate circumscribed, the Bedouin issue loomed ever larger because it was left outside their brief and thus not controlled. The official sponsor of the group, the water commissioner of the government, became convinced that the solution suggested was feasible. The Laqia incident presented the opportunity to suggest a new approach to the government. In 1979, the government decided to adopt the plan and appointed the water commissioner to negotiate with the Bedouin and to carry out the agreement.

The government decision turned out to be another beginning. The members of the Negev Planning Team now, for the second time, became involved in extended negotiations with various government departments and officials, trying to convince them of the feasibility of the plan. There was always a hidden threat in these negotiations, that the department concerned would find itself isolated, trying to defend a policy to which other departments no longer adhered. In some instances, the threat became serious — for example, when a department faced the possibility that it would not be invited to participate in the implementation of the project. Without persistent pressure and flow of communications, the project would soon have been abandoned, for even the government ministers who had voted for the program had constantly to be persuaded to continue to support it. There were crises when the whole venture seemed to be endangered. One occurred when a draft law that already had passed the first reading in the Knesset (Israel’s parliament) was to be redrafted; another, when the Treasury had to provide the budget for compensating and resettling the Bedouin. All the obstacles were overcome, and, in July 1980, the Knesset passed a law that incorporated the program. Once again, success led to institutionalization and to a weakening of the Team. The various government departments resumed control, and old policies were revived and fused with the new ones.
My part, as anthropologist in the project, also changed over the months. In the beginning, I was mostly concerned about the effects of current policies on the Bedouin and sought for alternatives. I hoped that someone in government would see the advantages of my approach; I was quite content to leave my involvement at that. My colleagues on the Negev Planning Team were persuaded of the usefulness of the basic premises I proposed and not only supported them but also incorporated them into their plans. It seemed almost self-evident that I should talk to various government officials about my ideas. None of the officials I approached refused to see me, but they responded with scepticism. Yet, as I continued to make the rounds, I heard echoes of my ideas. In retrospect, I realized that conversing had made an impact. But it did not reach the government, without whose approval no new policy could be sanctioned and no budgets would be allocated. In this respect, the water commissioner, who had friendship ties with several ministers, achieved the breakthrough. When the government formally decided to adopt the plan and appointed the water commissioner to head a committee of study and implementation, there was an immediate change: the members of the Negev Planning Team gained access to a new range of people, senior government officials, politicians, and Bedouin, and almost ceased to communicate with their opponents, the people who had hitherto governed the Bedouin. They discussed their plan with all these people and, in return, received new ideas and detailed suggestions as to its implementation. This interaction resulted in proposals that were assured of a good reception by the officials. After some time, the consensus was so much taken for granted that the government even hoped to persuade the opposition to support the proposals. After many vicissitudes, the members of the Negev Planning Team — who by then had come to put greater emphasis on the question of Bedouin land than on other plans for the Negev — persuaded the parliamentary opposition to vote for the new policy, as embodied in a rewritten draft law. In July 1980, the Knesset passed the "Law for the Acquisition of Land in the Negev (Peace Treaty with Egypt), 1980."

From this moment, the Planning Team lost much of its influence: the implementation of the project required the collaboration of numerous government departments, each of which carried out its task with its existing personnel and with its proven methods. It treated the members of the Team respectfully, because they still could wield influence, but as outsiders. As the Team was pushed aside, its members communicated less with each other, with government officials, and with Bedouin. In consequence, coordination lessened, consensus was no longer assured, and negotiations with the Bedouin population were suspended. The mediators felt that they had carried the project as far as they could and that the Bedouin could safeguard their position. If there were serious hitches, then, perhaps, the Team would need to rally again and mediate between the Bedouin and government.

conclusions

Multiple solutions must be sought to the problems pastoralists face. Modernization means that the nomad is to adapt to a diversified economy. Therefore, many slots are available and should be used efficiently. Neither a planned shift from nomadism to farming nor a shift to industrial work is sufficient alone. Such simple solutions cannot be held to ensure the nomad's
future. One must allow for rapid changes in the economy and never think in terms of unilinear development or progress. The option to return to pastoralism should remain open, even if only few people take it up.

In dealings between the state and the people, the state and its organs cannot be treated as a well-meaning, paternalistic, and monolithic organization. It is made up of numerous departments, each of which has its functional requirements, develops its own policies, and is made up of numerous officials. Also, officials do not necessarily act in accordance with official policies, because their actions are the outcome of exchanges with clients. Therefore, one must deal with officials at all levels. They all must be pressured continually to conform to planned activities. For this reason, the anthropologist must possess some power and be willing to use it. Better still, the clients concerned must exert pressures. They have an interest in the development and can thus be expected to organize. The anthropologist should seek to facilitate organization of interest groups and, above all, avoid coercing people to comply with government policies.

Communication is the key. It is necessary if one desires to enlist the willing cooperation of people. Therefore, the anthropologist must maintain communication with the various officials involved, with the clients, and, to no lesser extent, with associates. Communication facilitates agreement and the willingness to accept change. A breakdown results in immediate, and often unsuspected, difficulties and complications.

To ensure communication lines, planners must adopt a new approach. Traditionally, they submit reports to decision-makers, who are then expected to implement. In reality, this rarely happens for various reasons: the planners usually come up with a list of recommendations, which have not been examined for practicality nor have they been arranged in order of importance; also, planners do not usually work out a sequence for implementation that provides for unexpected events. A planner who wishes to provide for contingencies must try out recommendations and, thus, become involved in their implementation. The boundary between planner and decision-maker thus becomes blurred. The planner becomes more deeply and continuously involved and behaves more or less like a politician, maintaining communications with all those concerned with the development, becoming involved in the implementation of policies, and revising plans continuously to meet changing conditions. Therefore the initial report is of momentary significance.

The planner—anthropologist thus becomes a mediator in the sociological sense, who must be seen by all the parties concerned to be impartial and not a tool of employers and who must facilitate communications all around and, thus, create conditions for agreement and exchange. In the process, he or she will acquire power, which must be used constructively in the support of new ideas, compromise, and persuasion. In this role, the planner—anthropologist comes to manipulate and change the field of power, by introducing new participants, neutralizing others, and redefining issues. Finally, he or she must pave the way for gradual withdrawal, in a manner that will permit the parties to continue unaided.

The reader may have the impression that I am discussing a special case, and, indeed, every anthropological case study is special. But the conclusions can be generalized. I am convinced that any anthropological work of a political nature, whether begun as an applied or a committed study, must turn into mediation to succeed.
Goldschmidt: One of the important issues you raise is the need for the anthropologist to ethnographize the bureaucracy, the agency for which he or she works. This the anthropologist rarely does, but you clearly understand the character and organization of Israeli officialdom as well as you know the Bedouin. It might be instructive for those interested in this situation to examine *The Uses of Anthropology*, which I edited for the American Anthropological Association. It deals with efforts at applied anthropology between the wars and includes case histories written at the time by those involved. What they tell is largely of our anthropological failures, and these are instructive. I think this account of our failures helps us to have a sense of the ethnography of that part of the dyad, in addition to one of just the “target” population.

Rigby: Marx has presented to us a clear case of proletarianization during the 1960s. As a mediator between the people and the government, are you not perpetuating the status quo and the exploitation that exists, therefore reinforcing tendencies within the economic structure of Israel?

Marx: Proletarianization? The land concerned was in wheat, but it was of low productivity and susceptible to drought. The people themselves hoped the government would soon sponsor an irrigation project. They did not resist government intervention.

Bourgeot: Emanuel Marx presents a divergence between the functions of the anthropologists and those of the development managers. Let us suppose, now, that the anthropologist and the manager differ over changes to take place in the nomadic milieu. Let us further suppose that the anthropologist, strongly aware of this through his or her scientific insights, is charged with applying the type of pastoral politics elaborated by international agencies, the concerned government, or a research institute. What will happen? Which point of view should be considered, that of the anthropologist, scientifically founded, or that of the managers, supported by the politics of pastoralism? Certainly, the point of view of the managers will be assumed. One of the basic questions we should address is do anthropologists have the capacity to orient development or will development orient the anthropologists. There are permanent dangers, of which anthropologists in development must remain aware. The questions remain. How would the managers and other decision-makers use the work of researchers, and in the service of what cause do researchers work? Recall the strong links between certain anthropologists and the colonial army during the war in Algeria. Further, do development projects have the political and economic means to satisfy real needs of pastoral populations, or are the projects directed at exclusively economic ends, measured by the returns on “market exchange,” thus creating new needs without having satisfied those that already exist?

Aronson: The Bedouin case you discuss is not a special one; there is a remarkably similar case in Quebec. There the government wanted vast tracts of land for a huge hydroelectric project at James Bay. The land belonged to Cree and Inuit who derive their livelihood from hunting and fishing. My colleagues at McGill became involved, and their role evolved into precisely the mediating role you describe. The agreement negotiated is large scale and quite successful and is already serving as a model elsewhere in Canada, the
United States, and Australia. But your example, like mine, depended on a relatively impartial legal system through which matters could be adjudicated, a way of mobilizing public opinion for pushing government around, and a social order that protects the mediator and allows him or her to follow the implementation of the decision. All this is special to certain societies; I found it absolutely irrelevant to my work in AID in West Africa, where none of the above conditions applied. Mr Horowitz suggested one means of follow-through: the anthropologist in a senior position who has a long-term overview of programs. The indigenous social scientist in many countries has no such protection and cannot mount even the positive critique that would lead to the mediating role.

Marx: I am fascinated to learn that there are parallels to my case and wish to learn more about the work at McGill. The limitations you list ought to be considered, but I believe that the central object of the mediator, the balancing and manipulation of power, can be achieved in various conditions. With respect to Mr Bourgeot’s comment, it is difficult to establish whether the needs of the people or those of the government are being served; my focus has been not economics (which people understand much better) but power.

Ssennyonga: Marx’s discussion represents a timeless analysis. The question is what has the anthropologist’s role been. Many Africans, I know, feel that anthropologists have been partisans or participants in colonial systems. They argue that anthropology has no place in Africa because its past role was partisan. This image should be corrected; it hinders the acceptance of anthropology as a viable discipline in Africa. As anthropologists, we should reexamine objectivity and detachment; we cannot advocate the ethics of total detachment where universal human values are at stake. Such detachment is passive and may just observe oppression. We should, I suggest, uphold universal human values and bear the consequences.

Sandford: I have two points to make. First, “mediation” suggests a role between people and government that is authentic because mediators cannot act contractually with long-term obligations (to one side or the other). But governments also look for contractual parties on the other side, and they often do not exist in pastoral societies. A basic problem is mediating without two contracting parties. Second, planners are rarely in a position to make decisions. If anthropologists move into agencies they may become clerks rather than people with power.
the political economy of pastoralism
Fulani in ceremonial dress. Their society and way of life are profoundly linked to the political and economic factors in the wider society.
If bounded social systems of "nomadic pastoralists" were once the convenient unit of anthropological analysis, emphasis now is on the contingency of the nomadic and pastoral variables and on the openness of the social systems. Reconsideration of precolonial pastoral systems has led to a realization of the complex regional context within which pastoral production occurs. The regional context includes agricultural and hunting groups in East Africa, agricultural and urban systems in the Middle East, and, more recently, the pervasive influence of central markets and the state. Today, government interventions in the form of livestock marketing systems, pricing policy, schemes of settlement development as well as education have fundamentally influenced pastoral societies. Not only do pastoralists live within political economies of nation-states and international relations but are directly affected by intergroup dynamics of power operating through the state.

Salzman emphasizes the purely political dimension of state encapsulation of pastoral groups aimed at establishing control over semiautonomous and mobile peoples. Hjort develops the marginal position of pastoralism within most national economic and political systems and investigates the influence of trade in grain and livestock and intergroup competition for resources on pastoral production. Drawing on the Kenyan example, Migot-Adholla and Little discuss the influence of government policy and attitudes toward regional pastoral groups and describe some implications of "integrated regional development" plans that link pastoral and dry-land farming schemes. Rigby describes some of the regrettable consequences of commercialization of the pastoral economy and explains one aspect of pastoral reluctance to shift to sedentary agriculture in terms of the latter's lower productivity of labour. Using the West-African Sahelian example, Bourgeot develops from a Marxian point of view the implications for pastoralists of their insertion into national structures and assimilation into the world market. Looking at a specific institution of government influence, Nkinyangi relates how hidden costs and the features of mobility inhibit education among pastoralists.

The papers in this section clearly demonstrate that the dynamics of pastoralism are not simply internally generated but are outgrowths, in part, of wider political and economic structures. In particular, government policies and decisions about nomadic and pastoral peoples are essentially political, although they are couched in terms of economic development. One is reminded that the anthropologists and the development planners are part of this wider political setting and belong within a framework for an analysis of the "ethnography of planners."
political factors in the future of pastoral peoples

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The argument of this paper is that politics is a major determinant of social forms and social formations and a basic factor in societal maintenance or change and that consequently political processes and political structures must be given careful attention in research about the current situation and future possibilities of pastoral peoples.

This emphasis upon the importance of politics is not contradictory to, but an expression of, a pluralistic, or multicausal, view of societal process, in which there are a number of at least partially independent influences, psychological, demographic, ecological, organizational, economic, cultural, and political. I think it is doubtful, and hardly supported by historical and sociological analysis, that any one factor is an overall determinant, even in the long run or in the last analysis. Thus, although I emphasize in this paper the importance of the political factor, I do not mean to suggest that politics is the sole or even the primary influence in social life or that it is solely the generator of features in other spheres and not the recipient of influences from them.

One major basis of the import of politics is the fact, ignored and neglected though it be, that people have political concerns, objectives, goals that are ends in themselves, considered worth striving for on their own account. Examples of these are (1) order in social process, (2) peace in group relations, (3) security against incursion, (4) group autonomy, and (5) domination of others. These are objectives that can be, and are not infrequently, held worthwhile in themselves, that can guide collective action and define social strategies. They are not always mutually compatible and some form of priority ranking would often develop. Nor are they necessarily compatible with other goals of different types, ecological, economic, cultural, and so on, and here too priorities differ from person to person and group to group.

The second major basis of the import of politics is the use of political means, the use of influence, threat, and coercion, to achieve objectives and goals. Political means can be used to secure political goals. Political means can also be used to achieve other kinds of goals. It is an empirical question to what extent and under what circumstances and with what effects various political means are used in pursuit of individual and group goals.

The third major basis of the import of politics is the way in which power and coercion from external sources can influence, modify, transform, and even destroy a group, a society, a way of life. The terms of intersocietal
contact are substantially generated by nonpolitical factors, such as demography, technology, and culture, but the result of the confrontation is largely generated by the balance or imbalance of power. This is particularly important in the realm of relations between local and regional populations and representatives of supraregional, national, and supranational entities.

My position, in sum, is that how people act, what they think and say and do, and the circumstances in which, whether or not to their liking, they find themselves, the social processes in which they are involved, and the structures that to one degree or other enable and inhibit them can be understood as substantially the result of politics, of political concerns and objectives and goals, of political means used to achieve political and nonpolitical ends, of political power brought to bear from external sources.

politics among pastoral peoples

I would like to begin my discussion of politics among pastoral peoples with a simplistic distinction between indigenous pastoral politics and the politics of encapsulation. Indigenous pastoral politics is basically decentralized segmentary politics involving autonomous, contingent groupings. In contrast, the politics of encapsulation is a struggle for control, for domination on one side and autonomy on the other, between a vast, supraregional, centralized entity and smaller local and regional populations.

Although throughout history there have been many instances of the politics of encapsulation involving pastoral peoples, especially in Southwest Asia, North Africa, and East Asia, and although indigenous pastoral politics has far from disappeared, especially in remote areas, there has been a definite trend of ever-increasing strength, in the last hundred years, toward the politics of encapsulation. The simple fact is that state entities have gained tremendous strength in comparison with local populations, a fact attributable to technological developments in the realms of transportation, communication, and warfare, especially warfare. This is a result of the marriage between state development and advanced technology. It is not, in my view, a matter of the world capitalist system, or of socialist expansionism, or of neocolonialism. It is a matter of the use of military and other technology in state consolidation, a phenomenon characteristic of the last few hundred years, accelerated in more recent times in areas where substantial pastoral populations are present. Ottoman and republican Turkey, czarist and soviet Central Asia, colonial and postcolonial Morocco, imperial and Islamic Iran, socialist Mongolia, all share the encapsulation of local pastoral populations; whether the source is imperial or republican, colonial or independent, capitalist or socialist, modern firepower is uniformly devastating.

For pastoral peoples, then, the critical fact of recent and modern times is the rise of the state and its consolidation of control through military means. Consequently, in an understanding of the circumstances of pastoral peoples today, the political fact of encapsulation is foremost. Even before the full ascendency of the modern state and effective encapsulation of pastoral peoples, the impact of state entities was substantial even upon those pastoral peoples who avoided state control. An impressive example of this is the Yomut Turkmen, described by Irons (1975), whose nomadic and pastoral way of life was an adaptation primarily to the threat from the Iranian Imperial Army. As a result, the great agricultural potential of the region was not
exploited by the Yomut and remained untapped until recent times when the Yomut were conquered and encapsulated. They were, in fact, forcibly settled by Reza Shah and remained so as long as he remained on the throne. A short return to autonomy for the Yomut following Reza Shah’s abdication saw a resurgence of nomadism and pastoralism, but Iranian state consolidation since then has resulted in expropriation of local resources, decline of traditional political and social forms, and a major contraction in pastoralism.

Why should governments harass innocent pastoralists roaming the pastures with their herds; why should the state apparatus devote personnel, money, time, and energy, to encapsulate these poor, marginal peoples? The answer, of course, is that from a political point of view, these pastoralists were, and are, neither innocent nor marginal. The Turkmen are an exemplary specimen of predatory raiders, preying upon peasant and caravan alike, carrying off booty and slaves, and interfering with peasant life and commerce. In this, the Turkmen can stand for many Southwest Asian, North and West African, and East Asian pastoral peoples. In eastern and southern Africa, pastoral peoples satisfied themselves by expanding at the expense of their hunting and cultivating neighbours. Not only were pastoralists predatory raiders, but also they organized themselves into political entities, often with collective symbols and even officers that claimed autonomy and even regional ascendency. These local polities, often called tribes in the literature, were not just political rebukes to any aspiring central authority but often direct political threats, for many a state regime has been conquered by tribal peoples and replaced by tribally based dynasties. And if the political threat were not enough, there is the cultural conflict between the often different identities and traditions of state regimes and the pastoral peoples on their margins of control; once again the Turkmen at the margins of the Persian Iranian state are an exemplary case, being ethnically different and organizationally divergent, a tribal deviation from the urban and peasant civilization. This pattern is characteristic, from the Fulani in the West to the Mongols in the East. Consequently, there are several bases for serious concern on the part of state organizations about threats posed by pastoral peoples. In addition to these threats, pastoral populations, their animals, and the lands they control are potential resources for the state. There are clearly many good reasons for states to consolidate their control over pastoral peoples, and when they obtain the military means to do so economically and effectively, they do so, for example Reza Shah with the Turkmen and also the Baluch, the Qashqai, the Bakhtiari, the Kurds, and so on.

The current situation of pastoral peoples is to a substantial degree a consequence of this state consolidation and imposition of control. The Yoruk of southern Turkey, described by Bates (1973), were able to move into the region they currently occupy because the national government forced the previous occupants, a Turkman group whom it found worrisome, to settle. Once in place, the Yoruk, with their traditional political organization and officials virtually lapsed, found themselves adjusting to the interests and convenience of the local agriculturalists who had the support of the government. For example, the timing and route of pastoral migrations were not so much determined by the ideal arrangements to fill the needs of the animals but by the agricultural cycle of surrounding peasants. And because rights over pasture were given to the peasants by the government, the Yoruk had to rent pasture for their animals. Just as badly off are the Maasai,
described by Galaty (1980); much of their territory — and good, seasonally important pasture it was — had been expropriated by the colonial regime. The willingness of the Maasai to agree to a recent ranching scheme not entirely suited to their needs was largely a result of concern that unwillingness to go along would result in further loss of land. A less usual, and more fortunate, situation for pastoralism developed when the Fulbe, described by Frantz (1980), moved into the Mambila district of Nigeria and found government officials supporting an expansion of pastoralism even in the face of restrictive claims by the indigenous agricultural population.

The consequences of effective state control go beyond effects on pastoralism per se. One quite usual result is increased centralization and differentiation within the local and regional group as relations with government put control of the administrative apparatus in the hands of local officials, often the traditional leaders. This is seen among the Kababish of the Sudan, described by Asad (1970) and the Baluch of southeastern Iran, which I described elsewhere (1973, 1974). Economic and political differentiation is reinforced as some individuals from pastoral groups become educated and move into other sectors while maintaining a foothold in the pastoral sector.

Now much that I have discussed here is already past. What, then, does the future hold? Certain features of these past processes remain — notably, full encapsulation and effective control by the state, and the lack of cultural affinity between the state and its agents, on one side, and pastoral peoples, on the other. Our research priorities should, then, take these political factors into account and examine the circumstances under which governments act sympathetically toward pastoral peoples and the pastoral enterprise and the circumstances under which they act unsympathetically as well as the underlying reasons for this, whether they be political, cultural, or economic and whether they seem to be based in observable interests or in ideological orientations. Particularly worthy of attention, I believe, is the impact of electoral politics, given the fact that pastoralists, although they may occupy a large proportion of the land and may account for a substantial portion of national wealth in the form of livestock, are likely to be a numerically small proportion of the voting population. To what extent is pastoralism, whatever its potential contribution to the nation as a whole, disadvantaged because of the electoral weakness of the pastoral population?

At the same time, we must investigate the response of pastoral peoples to these circumstances and to the way in which these circumstances affect their political goals and their intentions to use political means to achieve political, economic, and cultural ends. What situations lead to demands for greater autonomy, and what situations lead to demands for greater integration? In what circumstances do disparate groupings attempt to form ethnic blocs for political and other ends? What are the parameters that define degrees of success in these efforts?

Make no mistake: political factors will play a major role in the future of pastoral peoples. We will do no one good service if we neglect the importance of political process and political goals.

discussion

Goldschmidt: The introduction of politics into our discourse is long overdue. I think it important to recognize that an element in this is the recurrent
phenomenon of prejudice — prejudice that long outlives the actual physical threat that pastoralists often face. This prejudice is old and widespread — I have even heard a Pueblo Indian anthropologist express it against a Navaho! It is found wherever pastoralists are found.

There is another point. Pastoralists are difficult to tax, and, for this reason, governments don’t like them. Furthermore, inasmuch as they generally live near the borders of their countries, they are almost always engaged in smuggling — again undermining governmental control. Thus, political control of pastoralists has always been deleterious to their welfare.

_Hopcraft:_ As political power is, on occasion, used to gain economic advantage, is there not an economic element in the political conflicts you describe?

_Salzman:_ Political means are of course used to gain economic ends, as stated in the paper. But this does not mean that all conflicts are about economics. The political, cultural, and other concerns that people have are also sources of conflict.

_Marx:_ The statement that nomads have been powerful opponents of the state does not appear to be justified by available information. Although pastoralists have carried out raids, which are a nuisance to the authorities, they have not concentrated their forces for an extended period. The so-called Bedouin States incorporated Bedouin but had a complex economic organization.

_Salzman:_ There are many well-documented cases of opposition to the state by pastoral peoples. Of course, many so-called pastoral peoples did have complex economic bases. And opposition can take many forms, of which the strongest one is taking over the state. Perhaps, it would be useful to look at the different types of opposition by pastoral peoples and to spell out the association between the social and economic structures on the one hand and the type and degree of opposition on the other.

_Rigby:_ The question is not whether the base or the superstructure is dominant. Salzman and Rigby both say politics is dominant. The issue in a mode of production is not that economics may dominate but whether we need to theorize about the relationships between institutions.
herds, trade, and grain: pastoralism in a regional perspective

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The fact that pastoralism needs to be seen in a regional perspective rather than as an isolated production system for an understanding of the changes in the living conditions of pastoralists has been pointed out by Bates and Lees (1977). They mention that local or regional subsistence activities have rapidly become part of much larger production systems based on exchange and specialization. Their suggestion in the case of pastoralism is that one must look at all options available to obtain nonpastoral products, and possible alternative reactions to change. I shall concentrate on a few aspects of relations between herds, trade, and grain, particularly in a situation of unbalanced pastoral production systems. The nature of the interface between pastoralism and other economic systems is ultimately formed by the marginal position of the pastoralist in the national political system. First, concern for politically important groups in the big urban centres governs the national goals for production in the arid areas, especially production of cheap meat. Second, the pacification of insurgents on countries’ borders makes pastoral development seem important from a strategic point of view.

Although there is a vast spectrum of pastoral—farming combinations, I shall mainly deal with situations where pastoral produce has been the most reliable form of food and has dominated the system of production.1 First, however, it is necessary to look at some of the constraints of pastoralism.

pastoral production

The purest form of pastoralism is an economic system in which all food for the household is produced from domestic herds. However, few pastoralists depend solely on their livestock for food production. They supplement milk, meat, or blood output from their domestic herds with grain consumption. Of course, the degree of dependence on farm products varies as do the forms to obtain them, directly through farming pursuits or indirectly through trade. Even the Maasai in Kenya and Tanzania or the Samburu in Kenya, peoples that have been used as examples of pure pastoralism, rely to

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1 There is, naturally, a wide range of literature within social anthropology that touches upon the issues at hand. Much of it focuses on relations between nomadic and sedentary ethnic societies (often hostile relations) whereas relatively little deals with the complementarity between certain forms of farming and animal husbandry.
a considerable extent on farm products. Therefore, analyzing pastoral food production solely in terms of production from family herds is only a first step.

Barth (1973) has suggested that the anthropologist, rather than concentrating on specific groups of people, should analyze the different production regimens that form part of the regional system of production, i.e., pastoralism, agriculture, crafts, trade, etc. I distinguish between different production systems also within pastoralism, depending on the species of domestic animals. The characteristics of the four different milk-producing animals predominant in Africa, Arabia, and Southwest Asia differ widely and have contrasting economic implications. I am thinking particularly of species-bound rates of reproduction, the requirements for mobility, the bulk of meat produced at each occasion of slaughter, the continuity and frequency of lactation, and finally, the market value. For example, subsistence on mobile camels and small stock requires activities different from those for relatively sedentary cattle and small stock, and camel pastoralism is similar to farming in that the family herd, like land for the farmer, is a fairly constant resource.

The production systems are geared largely toward subsistence production. Elsewhere Dahl and I (1976) have tried to demonstrate some of the biological restrictions on pastoral produce, i.e., those limitations that lie in rates of reproduction and level of expected production and in the temporal patterns of herd demography and seasonal production profiles, but a few major points are relevant for this discussion.

If an average household were to subsist solely on its domestic herd, and if this herd were average in age and sex composition (in fact, rarely the case), the household nutritional requirements would be approximately 318 g protein and 13,800 kcal/day. If the household were to subsist solely on cattle herds without upsetting regrowth, a herd of 64 animals would be needed. An equivalent for camels is estimated to be 28 animals. The figures vary with different breeds; yet, they indicate the magnitude of required herd sizes. Variations among small stock are even greater (Dahl and Hjort 1976). Few pastoral households specialize in one species of domestic animal, so food production estimates similar to the ones worked out by Dahl and me (1976) for various species are useful.

The figures are based on averages as if seasonal fluctuations do not exist. But they do, and this complicates the picture, especially in areas with one rainy season. A seasonal perspective demonstrates the import of the combination of large and small stock for three reasons. Generally, the peak of meat consumption occurs when the consumption of cattle milk is low. Small stock are more easily slaughtered than are large stock. Because of their size they can be consumed immediately after slaughter within the household, and because of their fast reproduction they soon replace the lost beast. Second, the seasonal lactation pattern of small stock frequently complements that of cattle. Third, and for the same reason as for slaughter, small stock are ideal for marketing and are an important resource in exchange for grain.

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2 The reference family consists of 4.9 adult equivalents — for example a father around 30, a pregnant mother of 25, two children of 3 and 8, and two related youngsters, one boy of 18 and one girl of 15.
role of grain

An economy based on livestock products is very efficient in fulfilling human requirements for protein. A herd of 28 cattle or 40 goats and 16 cattle would be enough to meet the protein needs of a household. It takes a considerably larger number to meet caloric needs, a fact that suggests the contribution of grain to the diet. Grain is a seasonal replacement for milk but may also be a regular supplement or ultimate reserve for bad years. As Bates and Lees (1977) pointed out, pastoralists may also find it worthwhile to feed their livestock with grain at times. This is, for example, the only way to ensure herd survival for the Amar’ar Bedawiet of eastern Sudan who sometimes have to keep large numbers of camels and small stock stationary and feed them on durra, either produced by the household or purchased at the market.

Even the driest areas of Africa usually provide some physical opportunities for riverbed or rain-based “take-a-chance” cultivation. Frequently, however, the possibilities are limited by health hazards in areas with permanent water and by labour constraints that may not allow any family labour to stay at a cultivation camp. “Take-a-chance” cultivation of sorghum or maize at a well-watered spot along the transhumance route is the simplest and least labour-demanding form; the practice does not allow complicated crop selection but favours grains that do not demand much attention between planting and harvesting. Although the grain adds to the dry-season diet, it is rarely a food reserve, because successful harvests are most likely to be in years of good rainfall when there is also milk.

There are many cases of barter between pastoralists inhabiting dry lands and farmers in better-watered areas. A few examples in Kenya are the Turkana who have traditionally bartered small stock for maize (or formerly millet) from neighbouring Marakwet; Rendile and Borana, from the Meru farmers in the Nyambeni hills; and Maasai from Kikuyu farmers. All over, such trade seems to have been significant, even if it has been obscured to outsiders because of hostile relations between the groups concerned. In some cases, it may have been carried out by special groups.

The exchange rates of livestock to farm products are vital for the standard of the pastoralists. Swift (1979a) has calculated a barter cost-of-living index for Somali families. With the assumption that three-fourths of food consumption is covered by farm products during the dry season and one-fourth during the wet, it appears that producers of camels and cattle have experienced decreasing ratios, whereas producers of small stock maintain approximately a constant ratio (Swift 1979a). Another example is that of the pastoral Barabaig in Tanzania. Kjaerby (1976) has recorded a modest increase in cattle prices and dramatic increases in maize prices over the last 20 years, giving a net decrease in the exchange ratios.3

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3 Swift’s figures for the number of camels needed to purchase the 725 kg of sorghum needed yearly by the reference family are: 1847 (0.7), 1891 (0.7), 1951–53 (1.5), 1956–58 (1.6), 1971–72 (2.6), and 1974–75 (0.7). The numbers of cattle needed for the same years are: 0.7, 0.8, 2.4, 2.8, 4.7, and 1.1; sheep: 4.3, 14.8, 9.0, 10.7, 9.9, and 4.3; and goats: 6.5, 30.2, 12.3, 13.7, 12.7, and 6.9. Kjaerby’s calculation is based on prices in shillings instead of barter rates. His ratios therefore become expressed in numbers of bags of maize per head of cattle sold: 1957 (18.0–12.0), 1967 (12.3–9.25), 1969 (11.7–9.7), 1971 (8.3), 1972 (7.2), 1974 (3.1), and 1975 (1.8).
The general trend is that farm surplus, earlier bartered with pastoralists, is now sold on the national or international market. The regional integration into these markets has caused both an increased emphasis on cash cropping and a shift in local trade from barter to cash exchange. One effect for pastoralists is a decreased availability of grain. Even if price relations do not change on the local market, frequent shortages mean that there simply may be no grain available, whatever the price. In such a situation there is little point in selling animals in order to obtain cash. In spite of improved transportation systems that provide the pastoralists with access to grain, the marketing structure of agricultural products contradicts an improved standard for the pastoralists. In general terms, this means that production tends to be exported to areas with higher buying capacity even in times of shortage within the local region. Not only does this structural change mean that food is rechanneled away from pastoral areas, but also it frequently implies a whole reorientation of agricultural production in adjacent farming areas from subsistence crops to cash crops such as cotton, coffee, or tobacco.

**livestock marketing**

The expanding monetary economy is felt not only through changes in the local availability or price level of grain but also through changed facilities for marketing of livestock. Pastoralists have a reputation for being reluctant to sell their animals, cattle in particular. Several partial explanations have been suggested. Historically, the market structure has not been beneficial for pastoralists. The purchasing policies of the main buyers of livestock favour the activities of intermediaries who decrease the profit of small producers and manipulate the timing of sales and auctions (Hjort 1979). The general policy has been based on political considerations to provide cheap meat for the urban population, a fact that keeps prices too low. There are technical constraints such as long trekking routes to markets, infrequent markets, quarantine restrictions, etc. It is also suggested that most pastoral livestock are needed within the pastoral production system, including oxen that provide a live store of meat and blood for dry seasons. Only during droughts when animals are dying are slaughter stock sold on a large scale. Under such circumstances the meat is of poor quality, and prices are low.

The majority of cattle for slaughter in a family herd are young bullocks, followed by old females with low reproduction, and old bulls whose services have become less efficient (Dahl and Hjort 1976). These categories of animals for immediate slaughter make up about 8% of the total herd on average at any particular time. This compares well with reported annual offtakes. Another 8% of the total herd die natural deaths or are killed in emergency slaughter.

An owner who foresees an animal's death may prefer to market it; this becomes a particular issue in times of disaster such as drought. Then the choice is between trading weak animals with a low return or gambling on their survival.

The effects of droughts are by no means limited to the period. Because of the mortality distribution (high among old and very young animals) and because of fluctuations in reproduction (no reproduction during a drought and unusually high immediately afterward), a drought may be felt for many years (see Dahl and Hjort 1979 for a discussion of such long-term effects).
Typically, post-drought, no older male stock or old cows are left. Also young males are nonexistent due to the cessation of reproduction during the drought. Hence, a shortage follows for at least 4–5 years of marketable animals and, particularly, of mature oxen that may be favoured on the market by price conditions. Some animals can come to the market 2 years after the end of the drought when prices are likely still to be high. However, commonly people prefer not to sell, a fact that has been labeled “a perverse supply response.” From the pastoralists’ point of view much labour has been invested in young bullocks but little extra is needed to fatten them for sale when they are fully grown. Only if the pastoralists have immediate cash needs, will they sell, because it costs them practically nothing to keep the animals. The risk, of course, is that by the time the bullocks are ready for the market, prices will have gone down. This risk is often too real, especially because the high prices are related to a general shortage; once pastoralists start to sell on a large scale, prices come down. In other words, the explanation for refusal to sell may not be as simple as a noncorrelation between stock prices and pastoral supply or the numbers of marketable livestock in the pastoral herds.

The “stratified livestock production system” is one in which the arid pastoral areas are pastures for immature stock and ranches in the better-watered areas are pastures for later fattening. The most labour-consuming part of beef production is the care connected with calf birth and the rearing of young calves and their mothers until weaning. The pastoralists do this work all the time; in fact, their dependence on milk demands a close relation between milch dams and their milkers. In the pastoral system, immature oxen are almost a by-product of work oriented to the production of milk and of reproductive stock that can ensure future food. Large-scale commercial ranches that depend on wage labour frequently buy immatures from the pastoralists because this is cheaper than hiring labour to provide intensive care for newborn calves and their mothers. A fully grown steer usually brings a better price than a yearling, and it is relatively easy for the pastoral household to let it follow the herd until it reaches maturity. Thus, they tend to be unwilling to part with their immatures unless forced by circumstances, such as immediate needs for cash.

**pastoralism off-balance**

Although grain is becoming less available in many regions because of attractive prices elsewhere, the dependency on grain is not decreasing nor is the need for money to buy grain. It is rather disconcerting that there is no scarcity of circumstances that force pastoralists to sell their stock prematurely.

In its pure or undistorted form, nomadic pastoralism represents a balance between human population size, animal population size, and pasture (Dahl 1979). It remains viable as long as the populations (human and animal) stay static, or as long as population growth can be met with territorial expansion. Today, however, most pastoralists live in a political situation where grazing land cannot be expanded, and, furthermore, pasture qualities seem to deteriorate. The balance is upset by exogenous factors. Regional development may, on the one hand, bring improvements into the system, such as enhanced health care or a more efficient outlet for surplus stock, but, on the other hand, its unplanned effects may be to siphon off crucial parts of
the labour force or to cause losses of important pieces of land. The ecological
model is no longer solely based on uncertain weather conditions but also on
planned or unplanned economic and political changes. The focus of study
has to be transferred from the problems caused by ecology to those caused
by dependence and regional inequality and must take into account
increasing political centralization and the submersion of subsistence
economies under capitalism. The stream of change may even set such
conditions for the model that no point of balance remains, generating,
instead, a vicious circle of interrelated losses.

The dwindling of land for the pastoralists is primarily felt in the reserved
grazing areas, used primarily during dry years. An example is provided by the
wheat farms within Masaiiland in Kenya. The local population agreed to set
aside land for large-scale mechanized farming, but, when drought occurred
later, they expected access to the better-watered land within the farming
area. Their claim was that the agreement was made under normal
circumstances and that during exceptional periods they must follow the same
principles as in the past, utilizing the farmland for grazing.

There is also an increased competition over grazing resources between
pastoralists and agropastoralists. By agropastoralism, I mean a system where
the main basis of food production is cultivation but where farm surplus is
invested in livestock, only later to be reinvested in agriculture (Brandstrom et
al. 1979). Cattle are the dominant means of expanding one’s labour force,
thereby increasing the cultivated area and, hence, the surplus . . . and so on.
In agropastoralism, food production from cattle is less important than is their
value as wealth. Agropastoralism may be an implicitly expansive and
ecodestructive system, because it encourages a husbandry oriented toward a
maximization of numbers rather than of quality as is necessary in milk-based,
pure pastoralism (Haaland 1975). In a competitive situation, the agropas­
toralists exploit pastures more than do the nomadic pastoralists because they
are content with merely keeping the livestock alive. They maintain the largest
herd that the land will support. Hence, the two are vastly different production
systems. Integrated in a growth-oriented Western economy, agropastoralists
spend cash crop earnings on increasing their livestock herds and expand into
areas formerly monopolized by nomadic pastoralists, creating a double
impoverishment for nomadic pastoralists who experience competition for the
limited pastures and can no longer obtain food within the region.

Competition for dry-season land, however, is not just between pas­
toralists and agropastoralists but occurs regularly between pastoralists and
agencies wishing to utilize the land for other development purposes,
connected with wildlife, tourism, commercial ranching, and irrigated farming.

The integration of pastoral societies into regional and national contexts
has prompted rapid stratification in local communities with respect to
economic, political, and social influence. The emerging leaders spread their
risks by diversifying their economic undertakings. Of particular importance is
their mediating place between the general pastoral population and the
administration and national bureaucracy.

Many are wealthy, controlling labour through an extension of traditional
forms of paternalistic protection, elderhood status, and food redistribution.
Their followings of dependants become large and their households influential
in the pastoral community. The internal power structure of the community
can be fundamentally altered, and yet, seen from the outside, the system
appears unchanged. Inside, established principles for redistribution of capital may have largely ceased because of the new links between pastoralism and modern capitalism. Individualistic forms of "insurance" against drought replace traditional institutions, such as stock friendship and clan solidarity, worsening the position of the less fortunate members of the group (Hjort 1979; Southall 1979). Many poor pastoralists turn to employment for extremely low wages. To support their families, low-wage labourers need the backing of kin or friends who are food producers. Thus, the pastoral sector supports the modern sector by providing subsistence for the families of wage labourers and, at the same time, loses members of its own labour force who may be vital to the maintenance of proper husbandry practices.

The stratification contributes to a double conversion of pastoralists to farmers (Barth 1964b; Baxter 1975): the rich invest in cultivation as a mode of diversifying and reducing risks, and the poor engage in small-scale cultivation — the only option for those who have no opportunity to leave their families or no market for their labour. The poor farmers cultivate either only for their own consumption or also for the market, in which case local officials tend to view them as promising participants in the development process. Similar processes may have occurred throughout history; they may even have been viewed as regulatory, balancing the ratios between humans, animals, and land. However, they are occurring more widely today than probably ever before. The reason lies beyond the ecological model in economic and political development. Regional differences increase; stratification evolves within ethnic communities; dependency, and patron-client relations grow.

The most visible expression of pastoral integration into larger political and economic systems is the emergence of small towns or rural centres that exist primarily for trade and administrative activities. They are the economic link between rural and urban lives through which consumer goods, livestock, and grain may be traded. For the administrator, they are the natural centres of communication and social service. For the entrepreneur, they are a source of cheap, occasional labour, and they filter rural (in this case pastoral) people into urban life.

Development efforts to involve pastoralists in a market economy should provide ways for them to invest cash and to obtain substitutional food. First priority needs to be given to efforts to improve the subsistence situation of the pastoralists so that a real surplus is created before resources are siphoned off. Not until a balance is obtained can a substantial offtake (meat, milk, or milk products) be sought for the national market. If a balance is not achieved, the societal costs may be high — violent large-scale migration of the pastoralists to the cities.

Any intervention in the existing production system has multiple and long-term effects. The interdependence between an expansive agropastoral production system and a pastoral production system exemplifies the complexities facing planners who wish to restructure existing land-use principles or to introduce new ones. Another example is the change in the production system of fishing projects parallel to a pastoral sector. The Turkana who fish in Lake Rudolf have purchased livestock, entering a traditional economic sphere by means of a new principle — buying. Their entry into livestock rearing has increased pressure on grazing in the area. Individual access to regular cash income may have two effects: the net effect
may be a rapid increase in the area herd through a purchase of livestock from outside or a change in the structure of ownership such that one builds up an unreasonably strong economic and political position in the traditional economy (Henriksen 1974). The transfer of wealth from one sphere to another should be discouraged but perhaps is unavoidable. A minimum ambition should be that no section of the population suffers as a result of regional development input. However, this may also be a difficult goal because the effects of every input are manifold not only because of the complexity of existing production systems but also because of the economic and political reality where development projects are to operate. Serious preparatory studies in combination with continuous evaluation of inputs are the sole possibility for success in at least understanding a particular development.

I do not mean that the studies need to be complicated but primarily that they need to deal with issues that might be politically sensitive because they need to include expressions of regional inequalities and of stratification as well as more technical aspects. The necessity for continuous evaluations of development projects has often been emphasized.

discussion

Hopcraft: The terms of trade between stock and grain may actually be better than was here suggested. The issue is the nonsale of male animals, primarily oxen, that have little productive value in the pastoral system. Also, what is a social irrationality exists despite individual rationality. Government intervention may increase profit by decreasing the number of animals and thus decreasing competition.

Sandford: One should beware of using data from a few years to prove long-term shifts in the terms of trade between grain and pastoral products. Short-term variability is greater than on a long term, and the use of a few data at the end of a long period to describe trends can be misleading. Also, you refer to profits made by intermediaries, implying these are high. Empirical studies generally show that though margins may be high, most margin is accounted for by traders’ costs, and profit rates tend to be low.

Hjort: Yes, I agree entirely on the first point. My intention here was to illustrate a hypothesis, nothing more. With respect to the second point, the issue is not profit for the intermediaries, but the loss of profit for the pastoralists.

Willby: Pastoralists trade livestock for foods, other than grain, that are important to dietary intake — honey and sugar for instance (which are preferred to grains in Somalia, which has one of the highest per-capita consumptions of sugar in the world), beer, bananas, beans, etc. They also trade livestock to obtain cash for a growing variety of needs, such as education (directly and indirectly in the form of clothing, bedding, etc.), veterinary drugs, radios, etc. Some pastoral groups commonly hire labour, either to cultivate for them, to clean out and repair wells, or even to look after herds. Often they pay in kind, that is with livestock, which in some instances is the accepted way for the hired cultivator to start a herd. However, such interdependence is often not a happy one; contrary to what was said in earlier sessions, pastoralists have usually been the aggressors, not the
victims, in clashes with agricultural societies. In most countries with significant pastoral populations, the livestock of pastoralists have been the main supply of meat for the nation and, in some cases (notably Somalia), a major component of the country's foreign trade. Lack of investment opportunities or reluctance to bank earnings from livestock trade is by no means universal. In Somalia, for example, pastoralists reinvest in small shops, trucks, water storage, etc., and a recent study of the livestock trade revealed numerous pastoralists have large savings in banks in the major towns, as well as with traders and business people. Pastoralists trade livestock for many reasons other than to supplement their diet with grain.
evolution of policy toward the development of pastoral areas in Kenya

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The perilous state of the rural economy in Kenya’s marginal areas has often been dramatized only during times of acute drought and famine. At the peak of such times, close to 3 million people, or nearly one-fifth of Kenya’s population, living in an area approximately 80% of the country’s total land are affected. Crop failures are in some cases total, and livestock losses may reach 50% or higher. Wisner and Mbithi (1972) have estimated that the most severe and widespread droughts occur about once a decade and may cost the government up to Ksh. 20 million in famine relief alone.

Less serious droughts, regional famines, and localized livestock losses occur with greater regularity. The general official response in the past has been to substitute for economic rationality with welfare programs. This, in turn, has led to only half-hearted attempts to find viable economic alternatives. Nor have the solutions (large-scale irrigation projects, group ranching, grazing block schemes, settlement schemes, etc.) been satisfactory.

The land, often referred to as arid and semi-arid or simply as marginal, where the pastoral populations reside, is characterized by a great heterogeneity in vegetation, soil, and climate. It is the area described by Ominde (1971: 146) as “... around the core region of the central highlands and the westward sloping plateau bordering Lake Victoria.” In terms of rainfall, arid and semi-arid areas may be identified as those receiving less than 800 mm annually; they generally comprise the rangelands, defined as “land carrying natural or semi natural vegetation which provides a habitat suitable for herds or wild or domestic ungulates” (Pratt et al. 1966).

Within the diversity of ecological characteristics and production systems, a number of general processes have been identified as threatening to reduce the viability of social and economic life and contributing to environmental degradation (Kenya, Government of, 1971). These include widespread overgrazing, soil loss, and increasing demographic pressure.

As the population of Kenya’s marginal areas has increased, both through natural population growth and through immigration from the higher-potential areas, conflicts over land use and the viability of productive systems of the marginal lands have become a vital issue in development planning. To date, the treatment of the issues arising from competition over land resources has been piecemeal. The general result has been rapid deterioration of the human conditions in these areas. It has only been in the last few years that a land-use commission was established in the Ministry of
Lands and Settlement, now in the Office of the President, to intervene in land-use conflicts. In reality, even this commission has remained largely ineffectual.

historical perspectives

Several major historical trends may be recognized as having contributed to the present situation in Kenya's pastoral regions. In the early years of colonialism, the predominant attitude of government toward the pastoralists was to pacify them and to maintain law and order. Fixed boundaries were therefore drawn with little regard to seasonal variation and the needs of the people for pasture.\(^1\) The establishment of native reserves with rigid boundaries undermined the intricate marketing networks that had previously existed between neighbouring agriculturalists and pastoralists. Furthermore, alienation of land for European settlement and later the creation of game parks deprived some of the people of their pastures.\(^2\) Whereas government development effort was concentrated in the highlands, there was some action in the semi-arid areas to reduce soil erosion and overgrazing. Although African cattle had been used initially to supply the raw material for European ranches, great efforts were made to isolate African cattle and discourage African pastoralism through punitive quarantine regulations. The regulations, in effect, greatly exacerbated grazing conditions in the African areas, as there was no official outlet for surplus stock.

The outbreak of World War II and the increased demands for agricultural goods it created led to even greater concentration of public resources and other services in the white settler areas. In the livestock sector, however, African producers were “persuaded” by the government to make substantial contributions to the war effort, even though serious drought conditions prevailed during much of the time. Often pastoralists who sold their cattle were not able to purchase alternative foodstuffs. The Ichamus of Baringo District refer to the 1943 drought as the Chai (tea) drought because, after they had sold their stock on the advice of government officials, the only commodity they were able to buy with their cash was tea. Although some attempt was made to stimulate African agriculture during the war years, this was inadequate to overcome the problems resulting from land shortage.

By the end of WW II, the range areas had so deteriorated that the problems of the pastoral peoples could no longer be ignored. One of the earliest attempts to deal with the issues was compulsory destocking, a measure that provoked so much political dissent it was soon abandoned. The government identified the salient problem, which was to form the basis of the so-called Ten Year Development Plan (1946–55), to be overpopulation in the African areas. Conventional wisdom at the time suggested that the

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\(^1\) For instance, in a Special Districts Law Ordinance (1934) the Provincial Commissioner of the Northern Frontier District was given powers to define grazing and water boundaries for the different ethnic and subethnic groups in an attempt to avoid armed combat and raids on livestock.

\(^2\) The Maasai, for example, lost the Kaputei Plains, Central Rift Valley, Mau Lalkipla and Uasin Gishu; in addition their form of selective breeding using Boran bulls was cut off. The Kamba similarly lost their most prized grazing lands (Mbithi and Barnes 1975).
problems of agriculture and pastoralism could be solved by resettlement of people in unoccupied lands. This would facilitate the reconditioning and rehabilitation of traditional African areas. Accordingly, the African Resettlement Board was created in 1945. This board was later taken over by the African Land Development Board (ALDEV), which had a wider and more comprehensive objective: it was charged with the implementation of the Ten Year Development Plan (1946–55).

Although the Ten Year Plan was intended for all African areas, the efforts of ALDEV concentrated largely in the semi-arid areas where projects on tsetse fly eradication, vaccination against rinderpest virus, soil conservation, afforestation, grazing schemes, boreholes, dam construction, and small-scale irrigation were undertaken. Another eradication scheme was locust control. To some extent, marketing was also developed, and stock routes were organized between the semi-arid areas and urban areas. The focus during this period was on rehabilitation, and the emphasis called for a defensive approach to the development of the pastoral areas; that is, the aim was to slow the rate of environmental degradation in the semi-arid areas. In this respect, the “battle to conserve the soil” (Ministry of Agriculture and Animal Husbandry 1962:3) did achieve some notable accomplishments; most important was the generation of useful knowledge on how to rehabilitate and rejuvenate degraded lands. However, the ALDEV method was so extensive that it could not have been continued or replicated in other areas cost effectively.

By 1954, a shift in colonial thinking toward the African areas took place, and the cause for the deteriorating conditions in the reserves was now seen to be mismanagement of land, not overpopulation. The issue then became intensification of land use in the African areas, not resettlement. The most important embodiments of the new policy were the Swynnerton plan (1954) and the report of the East African Royal Commission.

In the long run the Swynnerton plan aimed at revolutionizing African agriculture through the introduction of individual tenure and the cultivation of profitable export crops hitherto prohibited to Africans. The plan envisaged and encouraged the creation of landed and landless classes in the African reserves. Arguing for the eventual concentration of land resources in the hands of the most efficient producers, it anticipated an exodus of surplus labour from the land and their absorption into industry (Migot-Adholla 1979).

But the industrial revolution that was to facilitate the migration of surplus labour from African areas did not materialize. Instead this surplus population has since been moving into the semi-arid land areas, bringing with it technology more suitable for the relatively wetter areas and thus contributing to land degradation.

The Swynnerton plan did, however, recognize that the semi-arid areas needed special attention. It has been observed that this in itself was an important departure from the earlier policy that had ignored such areas. The problem of the semi-arid areas, according to the plan, was (Jahnke 1978:1):

Overstocking and uncontrolled grazing ... rapidly converting many of the semi-arid areas of Kenya into near desert or will do so in the not too distant future. This problem is so serious that the Governor's Committee
on African Reconstruction is asked to investigate it in all respects. Limitation of stock in these areas is the first essential which can only be attained by providing regular markets which will absorb all excess stock. The difficulty in marketing the present low grade animals is realized. The quality of the remaining stock can then be improved to a marketable state by applying controlled grazing, by improving water supplies and, where necessary, by tsetse eradication. Without these conditions, money invested in these areas is money wasted; yet livestock and their products could become easily the most valuable agricultural industry in Kenya.

Although it was realized that intensification of land use would not be possible because of the existing technology, it was accepted that these areas could be self-sufficient in local food products. More significantly it was appreciated that there were positive aspects to the pastoral areas and that with proper management increased livestock products could be derived from them. To realize this, the government launched 40 major schemes comprising stock limitation and grazing, livestock marketing, water development, and tsetse fly eradication. The districts affected were Kajiado, Narok, Baringo, Samburu, Elgeyo Marakwet, lower Kiambu, Mukogodo, West Pokot, Lamu, Kwale, South Nyanza, Taita, Kitui, and Machakos (Ngutter 1979). Many of these schemes failed, especially the grazing schemes, because they did not recognize that the unreliability of rainfall and variability of grazing in these areas made suicidal the restrictions on movements of animals. Thus, by the early 1960s, most of the schemes had been abandoned, sometimes, such as in the case of the Samburu, by a consensus vote of the local elders (Helland 1980a).

Following the serious drought and floods of 1961–62, concern over the development of the arid and semi-arid areas became more urgent, and the Range Management Division was established within the Ministry of Agriculture in 1963. Its agenda called for upgrading the entire range economy by conserving, managing, and developing these areas. At the same time, a more positive approach to livestock marketing was undertaken, and the previous African Livestock Marketing Organization (ALMO) was replaced by the Livestock Marketing Division (LMD). The new organization’s function was to facilitate the selling of surplus stock from the range areas. Initially, these programs tended to concentrate in the relatively more arid areas where extensive livestock production predominates (i.e., northeastern Kenya). The chief function of the LMD, to date, has been to supply immature livestock from the Northeast for fattening ranches in the Central and Rift Valley provinces. Consequently, the less arid areas (600–800 mm rainfall) where the integration of dry-land farming and pastoralism is possible were neglected. This includes Baringo, Kitui, West Pokot, and Machakos districts.

The impetus for the development of Kenya’s pastoral areas received additional support in the mid-1960s with the publication of the East African Livestock Survey. Unlike past accounts, the emphasis in this document was not on the negative aspects of the pastoral areas but on the positive contribution these areas could make toward bolstering the Kenyan economy. Untapped potential for a livestock export industry was seen in the pastoral areas. It was also pointed out that unless something was done to commercialize these areas, Kenya was going to have to import meat by the 1970s. To bring these areas into the commercial sector, the government had to make changes in legislation, and, as a consequence, there was the
introduction of the Group Representatives Act (1968), which made it possible for a group of pastoralists to register a large block of land with fixed boundaries. It was hoped that this would help the pastoralists to think of herd management more in the commercial ranching sense.

The group ranch became one of the major organizational structures for the development of the pastoral areas, especially the Maasai districts. With the registration of a block of land, the election of group ranch officials, and the election of group representatives, "the ranch is then incorporated as a business enterprise, a corporation which can hold property, acquire debts, etc." (Helland 1978). The benefits of the group ranch for its members were that, once the land was adjudicated, they qualified for loans to develop boreholes, vaccinate animals, etc. But this was contingent on the acceptance of stock quotas. In many cases, this restriction led to conflict among members, as the richer participants wanted large stock quotas and the poorer members felt that quotas would inhibit their chances of increasing their wealth. A compromise was reached, and it was decided that members would be allocated a minimum quota that was sufficient for viability and the richer members would then be given extra allocations (Helland 1978). It was hoped that this setup would lead to increased commercial sales, as members would have to destock to meet quota restrictions. Nevertheless, in many cases, the wealthier ranch members failed to meet quota restrictions, and the proposed commercialization did not take place.

There were a number of shortcomings with the group ranches that, in turn, led to a proliferation of problems. First, and most important, many of the group ranches were not ecologically viable units that met both wet- and dry-season grazing requirements. Not surprisingly, then, there was (and is) considerable stock movement between group ranches during the dry season (Halderman 1972). The result was large-scale control problems in an already difficult context. Second, the group ranch approach did not confront the major dilemma that led to land-use problems in the pastoral areas: that is, the issue of individually owned livestock on a communally held resource, land. What the group ranch did was to limit the land unit; it did not deal with the fact that land is still a collectively owned good. There was no individual responsible for upkeep of grazing resources. Finally, the group representatives of the ranches were young people, and this fact exacerbated social conflicts in a society where authority is vested in the elders. It also meant that the ranch members had difficulties acting as a collective body.

It is not surprising, then, that the group ranches were (and are) unsuccessful — a fact underlined by the reluctance of a major credit institution (the Agricultural Finance Corporation) to advance new loans to group ranches. The emphasis in the pastoral areas, as elsewhere, has been on the adjudication of land so that the land serves as collateral for credit. Yet, in the group ranch areas, credit institutions have found that land is not effective collateral because it is held in trust.

The second major organizational form promoted by the Range Management Division for the development of the pastoral areas was the supervised grazing block originally introduced under ALDEV. Although the logic behind the grazing block is ecologically and economically very complex, its major appeal appears to have been its potential to effect livestock sales. By having to pay a grazing fee, pastoralists would be forced to maintain only the most profitable number of animals. In Kenya, the present grazing block schemes are limited to the more arid northeastern regions of the country.
Similar to group ranches, they have run into problems in that the pastoralists have failed to adhere to their boundaries. One of the reasons seems to be that the grazing blocks were designed for cattle management in an area where camels and small ruminants are as important as cattle. The forage and water requirements differ for each species, necessitating the exploitation of different areas by different stock types. The pasture rotation systems designed for cattle were drastically at variance with the seasonal requirements of camel husbandry or even small ruminant production.

There has been a wide divergence between the government's perceptions of land potential and those held by pastoralists. Whereas the government sees potential for tourism (game parks), commercial ranching, industrial forestry (e.g., charcoal production), and irrigated agrobusiness, the pastoralists see the potential for dry- and wet-season grazing, maximization of the cows for subsistence and herd growth, integration of small stock with cattle, and provision of charcoal, honey, water, etc. for individuals. It has been satisfactorily argued by Wisner (1977) that the two sets of perceived land potentials are contradictory both directly and indirectly — indirectly, to the extent that legal, fiscal marketing, and transport conditions set up by the state favour the official uses and directly, to the extent that commercial ranching and indigenous livestock production systems conflict, the former favouring beef production and the latter emphasizing cows (herd growth and dairy products). Moreover, individualized property relations imposed to protect the interests in ranching, irrigation, forestry, or tourism obviously exclude the pastoralists from access to land that is important to the drought adjustment system of the pastoral mode of production.

the asal approach to pastoral development

The interplay between the different perceptions of land potential and the actual land-use patterns has given rise to fairly acute environmental stresses in the arid and semi-arid lands (ASAL). The major overriding environmental issues in Kenya today are those that are identified primarily with the marginal areas — soil erosion, water availability, and devegetation, but the broad issues within the ASAL may be summarized as:

- The implications of population growth, especially the relationship between density of population and environmental pressure;
- Food production, especially the relationship between increased food productivity and food self-sufficiency;
- Improved social services, basic improvement to environmental qualities, e.g., potable water, basic education, and improved health services;
- Energy self-sufficiency, especially the relationships between consumption of locally available fuel, e.g., wood, and its environmental impact; and
- Diversification of the pastoral economy — better integration of dry-land farming in pastoralism, as well as increased opportunities for off-farm employment (e.g., rural enterprises).

Aware of these issues, the government has recently embarked on an ambitious program for the development of ASAL. Motivated by an earlier International Labour Organization (ILO) mission report that strongly argued
for a change of policy and strategies for the development of ASAL, Kenya has given high priority to the people most neglected in the past, the inhabitants of the semi-arid and arid lands. Determined to give impetus to this commitment, the government established a Marginal/Semi-Arid and Arid Lands Pre-Investment Study Team in 1976. This multidisciplinary team has been charged with the identification and quantification of potential resources in these areas, specification of constraints, and the preparation of proposals for suitable projects for development. Although detailed studies have been completed, only in three districts is it expected that these studies will significantly contribute to the development of ASAL.

Further evidence of Kenya's new commitment to the development of ASAL is the increase in new programs and initiatives for the areas. These have been summarized by Ngutter (1979):

- The establishment of three river valley basin development authorities to plan for and execute development projects in the lands traversed by the rivers. Two of these, the Tana River and Kerio Valley development authorities, cover semi-arid and arid areas;
- The establishment of a rangeland ecological monitoring unit under the Ministry of Environment and Natural Resources (formerly Tourism and Wildlife) to advise on trends in livestock and wildlife numbers;
- The development of both a dry-land reafforestation research program and a dry-land crops research program for the promotion of technical packages suitable for the marginal areas; and
- The initiation of a project to construct 13 arid zone educational centres to provide boarding facilities for pastoral children and to serve as adult education centres during suitable periods in the nomadic cycle.

The important break with past policy toward the development of pastoral peoples is that the new approach promotes integrated development. There is a clear recognition that a comprehensive regional approach rather than one that focuses merely on livestock development or management is needed if the goal of improving the welfare of Kenya's arid and semi-arid land inhabitants is to be achieved. Thus, the new approach recommends a package that includes transportation infrastructure, social services, livestock development, rural industries, afforestation, soil conservation, marketing, and small-scale irrigation.

The implications of the ASAL approach for the development of the pastoral peoples are many. First, there is the impetus for integrating dry-land farming programs more closely with pastoralism. In the past, livestock programs have been kept separate from crop programs with the unfortunate consequence that many areas where mixed husbandry exists or is a possibility (i.e., 600–800 mm rainfall areas) have been almost totally neglected. In fact, historically, the marginal farming areas have received even less attention than have the more strictly pastoral regions. In terms of agriculture, this is partly explained by the fact that because of agroecological similarities between the higher potential African reserves and the areas of white settlement, it was possible immediately to extend to the farmer, the benefits of long years of research in agronomic practices and crop varieties.

The closer integration of dry-land farming programs and livestock programs comes at a time when natural and market forces are compelling
some pastoralists to incorporate grain production into their enterprises. In Baringo District, for example, many of the lowland pastoralists because of increasing demographic pressure and the lack of an adequate grain distribution system are shifting from a system of extensive use of land (pastoralism) to one that emphasizes increased caloric output per unit (grain production) (Little 1980). In other regions, such as parts of Kajiado District, the Maasai are increasingly favouring agriculture as a means of spreading risks against drought (Campbell 1979). Similarly, a number of former pastoralists in the Northeast have taken up agriculture along the Tana River. Thus, although much of Kenya’s ASAL is not suitable for any form of cultivation, either rainfed or irrigated, dry-land agriculture in some is increasingly becoming important, and the pastoralists there might be receptive to an appropriate technical package that includes drought-resistant crop varieties.

Underlying the integrated approach to the development of ASAL is the implicit assumption that pastoralism as a mode of production will not be an option in the future for all inhabitants of the pastoral regions. Pastoralists who lose livestock through either drought or disease are finding it much harder to rebuild their herds and reenter the pastoral sector. The decreasing availability of grazing makes it more difficult to move into pastoralism. This trend is exemplified in the recent increase of pastoralists in Turkana District who are joining irrigation schemes or fishing enterprises. Migration statistics from other pastoral districts also bear out this trend. The multifaceted package of the ASAL approach recognizes this phenomenon and offers the ASAL inhabitants alternatives to pastoralism, such as irrigated agriculture and off-farm employment opportunities (rural enterprises). Although these options will most likely not attract the rich pastoralists who favour the growth potential of livestock production, they may be of great assistance to the growing number of pastoralists who are being forced from the system, and they may, in turn, curb the flow of pastoralists from the marginal regions into the towns seeking unskilled employment.

The ASAL framework also takes into account the fact that pastoralists store their capital in the form of livestock. In effect, livestock serve as stores of value earning interest in the form of reproduction. This phenomenon was recognized by the Institute for Development Studies (IDS) team who worked in Baringo District and recommended that an integrated package include alternative saving facilities for herders (Institute for Development Studies 1979). Given the lack of alternative investments, most pastoralists reinvest their surplus in livestock. To introduce alternative sources of income such as irrigated agriculture or off-farm employment without providing alternative forms of investment may lead to the reinvestment of earned cash in animals.

To achieve the objectives of the ASAL framework, the government has established an interministerial coordinating committee to define policy for development. Because the committee cannot meet frequently, a planning and coordinating committee is proposed to handle day-to-day interministerial planning. Also, there is a technical committee comprising the relevant ministries or departments to be involved in the development. The institutional arrangement represents an improvement over past efforts where the concerns of pastoral development were mainly determined by the ministries of agriculture.
problems and prospects for the future

If some balance between the different components of the ASAL framework is not reached, the approach may overemphasize technical solutions (soil conservation, reforestation, etc.). Already, the ASAL approach seems to overemphasize physical rehabilitation projects without recognizing that the fundamental issue is land-use management, a socioeconomic phenomenon not a technical one. Given the centrality of land in Kenya's political economy, it is almost axiomatic that land use should be basic to the planning and implementation of any integrated development program. However, planning for ASAL has not always started, as it should, with a clear idea of the socioeconomic system and its organization. Most of the ASAL preevaluation studies so far isolate land tenure and land adjudication issues as constraints to the development of ASAL and emphasize rapid land adjudication as a means to better soil conservation and land management. The efficacy of land as collateral, especially in ASAL, is highly doubtful and should be critically evaluated (Migot-Adholla 1979), as should the existing range management techniques, particularly the group ranches. A positive change would be one that encouraged multiple land use based on flexible tenure related to social, ecological, and agricultural needs.

Also, some of the more important components of the ASAL package may not be operational because of Kenya's present economic conditions; specifically, the creation of alternative forms of investment and rural enterprises may be impossible. The concept of mobile banking facilities is one that appears sound on paper but may encounter great difficulties in implementation. The nomadic lifestyle of many pastoralists and their unfamiliarity with modern banking practices may impede the acceptance of such innovations. The pastoralists may well favour storing value in the form of livestock. The creation of rural enterprises in the pastoral regions is also likely to face difficulties. Most pastoral regions would have only a comparative advantage in small-scale tannery industries and would face stiff domestic competition; also the restrictions of imported leather products in many Western markets would greatly limit exports.

The most favourable aspect of Kenya's new policy for ASAL is the realization that the approach must be both flexible and experimental. As most of Kenya's development efforts in the past have concentrated on the high potential areas, what is possible in ASAL is still relatively unknown. The components of successful ASAL projects should be replicated elsewhere. The initial phases of the ASAL projects should remain experimental. More importantly, it should be recognized that many ASAL districts will be unable to make much contribution to Kenya's GNP for some time. Yet, with patience and dedication on the part of the government, it is probable that many of the areas can become self-sufficient in food production.

priorities for future research

There are a number of areas of research that are germane to the ASAL program. First, there is a great need for microlevel data on labour allocation in pastoral regions. This information becomes especially important when one is attempting to increase crop production in a pastoral economy. Delgado's work (1979) in Upper Volta is the only microlevel study of resource
allocation in a pastoral region. His thesis is that the economic specialization of Upper Volta’s Fulani pastoralists and sedentary cultivators is the most efficient means to overcome the labour bottlenecks of grain cultivation. In this system, the pastoralists herd the livestock of the farmers as well as their own. The peak labour period for agriculture (i.e., fencing and field preparation in the dry season just before the rains) is also the time that labour demands for animal husbandry are highest. Similarly, current research in Baringo District, Kenya, has shown that the increased emphasis on grain cultivation in some pastoral regions has exacerbated labour problems. In the past 2 years many of the shambas (farms) in Baringo District were planted late because the beginning of the agrocycle correlated with the period when the cattle and labour force were in dry-season grazing areas many miles away. Microlevel data on labour allocation highlight the labour conflicts in an agropastoral system so that policymakers can see apparent conflicts and suggest suitable solutions.

Second, studies of land tenure systems and the spatial economy of the pastoral regions must be conducted. They are especially important for considerations on the introduction of multiple land-use systems. The potential land-use conflicts between cultivators and pastoralists recently have begun to be documented for Kenya.

Finally, research that focuses on ASAL in Kenya must take a regional and multisector approach. The pastoral sector as it interfaces with both the regional economy (e.g., neighbouring agricultural markets) and the national economy (e.g., national livestock and grain markets) must be the focus. As Kenya has adopted a more integrated framework for the development of ASAL, it is important that all investment options be considered. These may include irrigated agriculture, rainfed agriculture, retail merchandising, contract labour, and fishing.

**discussion**

_Willby:_ Although this presentation is specific to Kenya, most of it applies to other countries in slightly different form. Periodic severe droughts are facts of life in arid and semi-arid areas and must result in dramatic reduction of stock numbers in one way or another: drought feeding, emergency slaughter, processing and storage, etc. help little, and deaths occur. Nevertheless, buffers against such disasters are continually sought, as are means to hasten recovery. Konczacki’s proposal for insurance, based on organized financial sources during good times, to help feed pastoralists and to help them restock, bears consideration in some countries.

Population increase is a major factor in deteriorating living standards in most pastoral communities. It is essential to plan for alternative employment of at least the increase. And so far, government efforts to “place” surplus pastoralists are not adequate. In the interests of overall productivity, we hope to see (as suggested by the Migot-Adhola and Little paper) more livestock on the rangelands (as a result of improved carrying capacity by investment and technical interventions) but fewer people.

Attempts to bring some of the advantages in higher productivity and profit of modern ranches to the pastoralists have involved the use of some sort of “group (collective, cooperative, association, the name does not matter much, and its characteristics are invariably local) ranch” entity, from
Somalia in the north to Lesotho in the south of Africa. Such entities, as vehicles for investment and technical intervention, must ultimately succeed, and social anthropologists have a major role in monitoring, evolving, and improving the design and operation of them.

Cultivation of preferential spots of land in generally marginal areas almost invariably ends disastrously. There is much evidence of this even in developed countries, albeit recent moisture-storage and minimum-cultivation techniques, combined with skill and heavy investment in machinery (not generally applicable to pastoral societies), have brought some success.

**Galaty:** The notion of integrated regional development appears sound on the surface, aimed as it is at the optimal use of resources in given regions and providing a mixture of production forms. However, is there not a fundamental asymmetry between the power of pastoralists and that of farmers, so that the possibility of dry-land farming will be favoured over the pastoral use of the same land? Will there not be extensive land conflicts between farmers and pastoralists in such an integrated development project? And won’t there be a continual encroachment of farmers into pastoralists’ lands, thus reducing pastoral dry-season grazing and, in the long run, diminishing rather than strengthening the pastoral sector?

**Little:** I have been referring to areas where pastoralists (often the poor ones) themselves are beginning to take up cultivation. I was not referring to areas such as Narok, where cultivating groups have taken dry-season grazing areas from pastoralists. Of course, we need to be aware that any integrated program that includes cultivation and livestock may exacerbate land problems. An appealing aspect of the ASAL program is the attention it gives to technical packages for marginal areas where pastoralists are at present growing unsuitable crops. A form of zoning would avoid some of the conflicts you speak about.

**Hopcraft:** Integrated programs may have been oversold. Because planners feel impotent vis-à-vis the livestock sectors, they turn toward agriculture, although crops may not thrive in semi-arid regions. In the long run, is not livestock production the best use for pastoral areas from a national perspective? Crucial are the terms of trade between livestock and grain and better markets so pastoral people can be assured of grain when they sell their livestock. In the past, pastoralists have wanted to buy grain, and it has not been available. Thus, it does not seem wise to promote increased cultivation in marginal areas.

**Little:** I agree that marketing is a key issue, but in the short run something must be done in Kenya until marketing arrangements are improved. In many marginal areas, substantial famine relief is common. As the pastoralists are in many cases beginning to increase cultivation to become less dependent on the uncertain distribution of grain through markets, it makes sense at present to encourage cultivation in some areas.

**Willby:** The logical use of these lands would be for hay and forage crops, not grain. Why should not the pastoral areas be restricted to livestock production, and the people encouraged to raise fodder crops?

**Little:** The main problem is that such an arrangement would force many people out of the marginal areas because pastoralism is increasingly less of
an option for some pastoralists. A scheme that emphasized fodder production would force some pastoralists out; it also assumes an efficient grain distribution system for pastoralists who sell their stock to buy other foodstuffs.

Khogali: Is it not true that the peak labour period for agriculture is the rainy season when labour demand for pastoralism is less? If so, why can there not be a mix of activities that would make the best use of available labour?

Little: In most take-a-chance marginal areas, the peak period for agriculture is just before the rains when fields need to be prepared. It is essential to begin planting as early as possible. This period is also a time of high demand for pastoral labour.

Mpaayei: Forty years ago, the Mau hills were opened up for wheat production, around the altitude of 2400 m. But no provisions were made for the repercussions; people in that area were pushed south. Drought followed. I urge planners to consider the long-term effects of their proposals. I am disappointed at the lack of discussion about climatic implications in the integrated approach you set forth.

Sandford: No one land-use plan is for eternity. It depends on technical knowledge, relative prices, and factors of the moment (such as the availability of labour). All these things change — a fact that may imply changes in appropriate land use. One should not rely on government zoning as a way of defending pastoralists' land rights against incursion by cultivators. The almost universal experience is that governments will not enforce this technical judgment on appropriate land use against political pressure. Pastoralists' land rights have to be protected by adequate property rights and a legal system in which these rights can be defended.

Ssennyonga: Whereas your paper exhibits enthusiasm about an integrated approach, it does not explain how the approach is going to come about. A multiplicity of change agents talk about this integrated approach, but they do not attempt to integrate their own activities or plans with existing systems. Consider, for instance, the existing lowland Marakwet water management and irrigation systems, which integrate water needs for domestic consumption, irrigation, and livestock. The Ministry of Water Development is concerned with domestic water, the Ministry of Agriculture with water for irrigation, and the Ministry of Local Government with water for urban needs and the generation of electricity. Who will integrate all these activities and goals?

Little: There is no doubt that integrated development programs depend on the cooperation of various ministries, and there is a set of potential conflicts. In Kenya, should projects concerned with semi-arid lands be administered by the Ministry of Agriculture or the Ministry of Water Development?

Horowitz: In the Sahelian situation, the problem is not simply other ethnic groups practicing agriculture in the arid zone but also members of the same groups as pastoralists (the Fulani) moving in or adopting forms of agriculture.

Sandford: I would like to return to the issues of labour productivity and the requirements for pastoral labour, which represent an important research area. Hjort claims that additional labour costs zero, but the amount of such
labour obviously has a limit. There has been little quantification in this area, and longitudinal research is needed.

Aronson: Sales of livestock need not relate directly to stratification. For instance, in a project in Senegal, pastoralists retain control of the fattening of calves. Thus there is the possibility of stratification of production, without necessarily the sale or alienation of calves from their pastoral owners.

Horowitz: I deny that involvement in the cash economy is necessary before pastoralists will sell livestock. Before the Sahelian drought, 1 million livestock were sold before the intervention of agencies or the provision of credit. Rationalization of the system of quasigovernment organizations suggests that the system did not work before; however, it did work and often more rationally than at present. For instance, it is more economic to walk animals to market than to take the train, as is now encouraged.

Salih: The paper raises very important issues regarding research on pastoralism. First, it deals with the problem in a historical perspective, isolating and discussing the successive stages through which this society has evolved. Such an approach is essential for a better understanding and analysis of present pastoral populations.

Obviously, pastoralism is a dynamic process of ecological adaptation to exploit the available natural resources. Different pastoral groups in precolonial times could expand their territories by conquering their neighbours, whether their neighbours were other pastoral groups or settled farmers. They used to move great distances during times of drought. But native administrations, claiming to maintain order, peace, and security in tribal areas, stabilized this process by putting certain restrictions on the movements of pastoralists. By this stabilization, pastoralism lost the mobility that was one of its adaptive characteristics. In many cases this loss has created overgrazing. So, for such groups, pastoralism will not continue to be an option. In the Sudan, in the past, pastoralists changed to sedentary populations along the Nile valley or in established irrigated schemes like the Gezira. Also, limited numbers of them migrated and settled in towns, as they continue to do. The only option for them, after stabilization, has been settled farming. But recently with the growth of urban centres followed by expansion in mechanized agriculture, pastoralists have gained more options when there is a lapse in pastoral production. Pastoralists may now convert to urban workers or into agricultural labourers. Paradoxically, the factors that contribute to discontinuity in pastoralism for certain groups are the same factors that create these new options.
Theoretical implications of pastoral development strategies in East Africa

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The issues in this paper outline a comprehensive theoretical and comparative study. My setting them out in this abbreviated and preliminary fashion will be justified if it illuminates the core questions that are of concern to this conference: What is the relevance of research in pastoral social formations to the practical issues of their inevitable transformation? And how can the theoretical underpinnings of such research be made more relevant?

Rather than attempting to evaluate the consequences and achievements of livestock sector interventions in semi-arid regions — a task that has been admirably addressed in a number of recent discussions and publications — I shall take a much more reflexive approach, exploring not only the principal social, economic, environmental, and other assumptions that implicitly or explicitly underlie these interventions but also the very nature of the research process itself, its theoretical problems, and its relevance to the historical processes manifested in specific pastoral social formations. Brief examples of this approach have been presented by Dahl and Hjort (1980) and Salzman (1980) in recent discussions of the concepts of pastoralism and nomadism.

Clearly, my task demands extensive analysis of the relations between specific data, theory, and praxis — my final intention. My present evasion of this demand may be excused, if not justified, by the relevance of the issues and the fact that this version of them was at least partially formulated while I was resident in an Ilparakuyo pastoral homestead with little access to the documentary materials I have gathered for the wider task.

Basic to my argument is a central element in the problematic of historical materialism: there is a dialectic relation between theory and praxis in any social science that has any historic significance.

My discussion is limited to the pastoral social formations of East Africa. There are both theoretical and practical reasons for this. The preliminary point I wish to make is that historically the pastoral formations have not been part of, or linked to, precapitalist state structures (with the exception of the pastoral elements of the interlacustrine states, which form a special case and are not subject to the generalizations advanced here).

Although the pastoral social formations of East Africa have been interdependent with nonpastoral neighbouring peoples, they have an historic specificity that distinguishes them from many of the pastoral societies of West and North Africa, the Middle East, and Asia (Lefebure 1979; Rigby 1979b). I am not putting forward an argument for historical particularism, which, as Salzman argues (1980), may exclude theoretical formulations; in fact, both
Salzman's concern over the "materialist dilemma" and Asad's (1978) application of the mode of production concept are inadequate. The issue is the nature of the historic specificity of the East African pastoral formations and the consequences of this specificity for the mode of production concept and the development strategies that have intervened to transform them, and vice versa.

The second central issue encompasses the following elements: the pastoral peoples' precolonial transformations in relation to their nonpastoral neighbours, their articulation with peripheral capitalism in the colonial state, and their continuing and increasing articulation with unique forms of capitalist exploitation through the national state structures of East Africa. One manifestation of penetration by peripheral capitalism is the loss of pastures and water resources because of the encroachment of government-sponsored cultivation (and other activities, such as creation of wildlife and tourist sites); this is still a burning issue. It has resulted almost universally in increasing interdependence between pastoral formations and their cultivating neighbours. Sometimes, this interdependence is accompanied by at least minimal engagement in agricultural production by formerly "purely" pastoral formations such as the Barabaig, IIparakuyo, pastoral Maasai, and Borana (Kjaerby 1980; Rigby 1979, 1980; Parkipuny 1975; Ole Saibull 1974; Dahl 1979).

The implications of the trend toward agricultural production, which has been (and still is) encouraged or actively enforced by both colonial and national governments, are particularly manifested in changes in the pastoralists' returns on labour commitment, a major problem examined in detail for the Barabaig by Kjaerby in a seminal paper (1980). Two major problems that require detailed and intensive research in probably all pastoral areas arise from Kjaerby's findings for the Barabaig: pastoral production requires a much heavier commitment of labour on a 365-day basis than does cultivation, but even with this high labour commitment and its consequent implications for development strategies (for example, education), Kjaerby's work clearly indicates: "the productivity of labour in cattle production is generally higher than for maize production." Kjaerby rightly concluded (1980:103-104):

The general superiority of labor productivity in cattle production over that in maize production is basically related to environmental and climatic conditions which are more suitable for cattle production. . . . In contrast to agricultural societies, where the labor power of school-aged children is more marginal and temporary to agricultural activities, children in pastoral societies are heavily and continuously engaged in herding, day in and day out, and this explains the reluctance of pastoralists to send their children to school. It thus has to be made clear that this reluctance is not due to conservatism or ignorance as maintained by some government officials, but due to the problem of having to carry out a lot of labor tasks.

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1 A contemporary example of immediate importance is the resurgence of the debate on the exclusion of the pastoral Maasai from the Ngorogoro crater in Tanzania, in which almost all the demonstrated facts of pastoral production and appropriation of the environment have been inverted to justify the position taken by agencies of development in the area.
This statement applies equally well to the Ilparakuyo whose elders and ilmurrani (young initiated men, “junior warriors”) are taking an increasing load of day-to-day herding so that young boys (ilaiyok) can go to school. I suspect that this situation is almost universal in the pastoral areas of East Africa. There is an urgent need to understand its full and long-term consequences.

Ilparakuyo and Barabaig are fully aware that labour returns are much higher for pastoral than for agricultural activities, despite the fact that many Ilparakuyo live in areas relatively well suited to cultivation. As Kjaerby succinctly noted for the Barabaig (1980:46):

> From the point of view of pastoral land-use we have a contradictory situation. Land alienation [and for Ilparakuyo I would add villagization] and alien agro-pastoral encroachment has led to an increase in stocking densities. The Barabaig are fully aware of the problem but, willingly or unwillingly, contribute to this trend by adopting cultivation. The historical conditions influencing national agricultural policies have imposed an untenable situation upon the Barabaig [and, I would add, Ilparakuyo, pastoral Maasai, and others]. They are forced to undermine the environmental basis for their preferred way of life.

The Ilparakuyo differ from the Barabaig in that most of the labour involved in their maize and food-crop production is supplied by their cultivator neighbours, in return for cash or pastoral products, usually both, with increasing interdependence between the two groups (Rigby 1979a, 1980). At any rate, a major question to be answered for each pastoral area undergoing these pressures and trends, then, is why do pastoralists begin to cultivate or aid and abet the encroachment of cultivation upon their own environmental base.

This question has deep theoretical implications that need to be explored. But first, I must return to the question of the nature of pastoralist production in relation to the concept of modes of production and these historically specific social formations.

I commence by reaffirming Asad’s position (1978:61) that theoretical development cannot take place without “the adoption of a problematic based on a coherent concept of mode of production.” But Salzman’s worry over Asad’s formulation is very real, for the latter, although rightly eschewing a “pastoral mode of production,” fails to develop two aspects of the argument essential to the historical materialist problematic, thus leaving himself open to what Salzman identifies as the “materialist dilemma.” One may uncover these two aspects by examining this false dilemma.

The development of the mode of production concept in general, and in relation to East African pastoral formations in particular, does not depend upon a choice “between a reductionist position which does not seem to be able to work in practice and a permissive position [attributed by Salzman to Godelier] in which mode of production accommodates so much that it means little more than way of life” (Salzman 1980:4). Although a mode of production is a unique articulation of the forces and relations of production, it is also a unique articulation of the economic, juridicopolitical, and ideologic instances of that social formation. These two forms of articulation are indissolubly linked in any particular mode of production, and one cannot be discussed without the other. Thus the question of a “choice” between a “hard” position in which “social organization, kinship, political structure,
ideology, and other idea systems are determined superstructures” (Salzman 1980:4), on the one hand, and a “soft” position in which all these represent a random hodge-podge or a “way of life,” on the other does not arise. The concept of mode of production enables precise theorizing about the role of the instances in any social formation in relation to their dominant or nondominant position within it and the nature of their articulation with each other. Let me illustrate this in relation to East African pastoral formations.

It is generally recognized in historical materialist analysis that only in the capitalist mode of production does the economic instance determine its own dominance. In all other known precapitalist modes of production, the economic instance determines the dominance of either the juridicopolitical or the ideological (or both) instances. In the Germanic mode of production, which admirably characterizes the basic articulation of forces and relations of production in East African pastoral (as well as agricultural) social formations, the ideological instance is dominant. But it is at this point that one must turn to the nature of theories about a mode of production.

A mode of production is a theoretical construct that does imply generalization, as Salzman asserts (1980:4), but theorizing about a mode of production cannot proceed without reference to the historical social formations in which it occurs, whatever the opinions of Hindess and Hirst (1975) to the contrary. The successful application of the concept of Germanic mode of production to East African pastoral formations (as well as to their cultivating neighbours) thus entails specifying the real nature of the dominance of the ideologic instance in them.

Both descent and kinship organizations and age-set systems emanate from the ideological domain, representing arbitrary categorizations of relations referring to biologically assumed characteristics and functioning, on occasion, as relations of production. I have suggested elsewhere (Rigby 1980) that there is a correlation between the relative dominance of one or other of these principles of organization and the relative emphasis upon pastoral-versus-agricultural activities. There is no need to repeat those arguments here. But the age-set organization is ideologically dominant and functions as a relation of production in pastoral formations such as the liparakuuyo (Rigby 1979a); furthermore, it is elaborated in other ideological constructs relating to the nature of pastoral appropriation of the environment, as opposed to the agropastoral or agricultural formations within the Germanic mode of production. This thesis can best be elaborated by a comparison between the pastoral and agricultural instances of the Germanic mode of production.

Lefebure (1979) has shown clearly the crucial role of descent ideology in the reproduction of social formations using the Germanic mode of production. I have extended this argument to the role of age-set organizations in specific East African pastoral formations, in comparison with those in which descent ideology is dominant (Rigby 1979a, 1980). But one crucial element has been missing from my earlier formulations, and this concerns the

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2 I am somewhat puzzled by Salzman’s dismissal of the concept of the Germanic mode of production as “anachronistic,” because he gives no reasons for his epithet nor any critique of its extensive use in the analysis of pastoral social formations. Using Salzman’s logic, can one dismiss in similar fashion such “anachronistic” ideas as that of kinship system and political organization?
nature of pastoral appropriation of the environment and the central role of ideology in this most basic of “economic” processes.

Most cultivating communities in East Africa represent the Germanic mode of production in which the domestic group is the major unit of production and reproduction, both social and biological, linked in wider community relations of production by some form of lineal-descent ideology, kinship, and affinal organization. Appropriation of the major means of production (land) is ideologically based upon communal tenure of areas in which descent-group members and their associated kin and affinal links establish rights of usufruct. The exercise of the rights of usufruct, however temporary, is based upon the domestic group, its head, and the matricentral units of married women within it and represents a direct and exclusive appropriation of land; legal mechanisms exist in the juridicopolitical domain to order and maintain the rights of exclusion. In agricultural formations, the cultivators objectify nature (land) in two ways: ideologically as communal property and actually, through appropriation, as an exclusive possession, albeit temporary and subject to a number of community strictures. In a materialist sense, the core notion of a proprietary right in nature is established and maintained through the right of exclusion (Marx 1973). Cultivator is “subject”; nature is “object.” The apparent but not serious contradiction in this form of the appropriation of nature is resolved by ideological elaborations upon the mystical relationship between lineal ancestors and areas or objects in the physical environment.

In contrast, the East African pastoral formations, which also represent the Germanic mode of production, rely on the herds, not the land, as their major means of production, although there are elements of differential control over certain natural or artificial resources (such as wells) by descent groups. This control, however, is never exclusive. Community relations of production among, for example, Ilparakuyo and pastoral Maasai, are based upon age-set as well as kinship relationships.

The main point here is that, whatever the nature of control over the herd and its products (and there is some theoretical controversy on this question), the control that the domestic group has in the herd as the major means of production is not a proprietary right in nature, as in land, but in a product of social labour itself in the context of a generally accessible nature. Thus nature is not apprehended as object in which pastoralist as subject establishes rights of exclusion. This basic economic fact is elaborated in the social formations in terms of the identification of land and its flora and fauna generally as a “gift from God” (Nkai for Ilparakuyo and pastoral Maasai) and an ideological stricture upon digging it up (and hence destroying it) or killing the fauna that occupy it (as in hunting).

Here, then, are a number of issues of major theoretical and practical significance. Although both cultivator and pastoralist in East Africa represent the Germanic mode of production, the differences in the major means of production result in distinct manifestations of this mode of production in historically specific types of social formation with distinct dominant ideologies, as well as distinct emphases upon organizational features, such as age-sets and descent groups.

The historic uniqueness of the East African pastoral formations is radically affected in a most fundamental sense by any trend toward cultivation, although this does not represent a transformation of the mode of production. Not only is there a shift in emphasis from one means of
production to another (the herd to the land, the factor of labour being constant but differing in productivity), but there is also a drastic change in the form of objectification and appropriation of nature and its dominant ideological underpinnings. This in turn involves a revaluation of the constitution of the subject and the objectification of the other, a fact that threatens the foundations of the social formation itself and the ideological conditions of its reproduction. Hence, the pastoral groups are reluctant to adopt cultivation, despite the mounting pressures at all levels for them to do so, and are searching for other methods of "dealing with" the encroachment of commoditization and the penetration of peripheral capitalism. To elucidate further, I turn briefly to my research among the Ilparakuyo of Tanzania.

Ilparakuyo, like all other pastoralists, have long been faced with diminishing resources of suitable grazing and water facilities. As a result, herd size has decreased, and there is a consequent increase in dependence upon agricultural products. This trend has been accelerated in recent years by such government policies as villagization. In the Ilparakuyo area of West Bagamoyo District in which I work, the herders' village (kijiji cha wafugaji) — allocated to the villagization of the whole Ilparakuyo community in the area — is only 90,000 acres (~36,000 ha), much of which is still tsetse-infested, although clearing is continuing.

There have been several responses by the Ilparakuyo to the increasingly untenable conditions. Some homestead groups and clusters (ikang'itie) have opted for the age-old solution of moving from the congested areas to new rangelands where herd size can be increased again and a largely pastoral mode of existence be reestablished. Such areas still exist in parts of east—central and southern Tanzania such as in the Morogoro and Mbeya regions, and my recent visit has verified the continuation of such moves. However, this is obviously a short-term solution.

Others have increased their interdependence with their immediate cultivating neighbours by exchanging pastoral products or cash from pastoral products for labour in the cultivation of crops, or the direct purchase of grain from them. Still others have entered into largely illegal trade in beef cattle and veterinary medicines, both of these activities reinforcing the crucial role of the junior (and senior) warriors (ilmurran) in the social reproduction of their society (Rigby 1979a, 1980), through the rebuilding of the homestead herd. All of these are attempts to deal with peripheral capitalism without capitulation to the relatively poorer status of cultivators or being swamped by commoditization with its end not only of "peasantization" of the pastoralist but also of the ultimate "proletarianization" and "marginalization" and the formation of classes in previously classless social formations.

For the time being, some of these are solutions for Ilparakuyo, leaving intact the ideological conditions for the reproduction of their pastoral social formation. But even if the cultivators and not the Ilparakuyo are actually digging the soil and cultivating the fields, the Ilparakuyo are being inevitably drawn into forms of objectification of their environment that compete with their cultivating neighbours and that ultimately deny and destroy their own mode of existence.

In conclusion, it is imperative that research be concentrated upon some of the processes briefly identified here; at the same time, theory must constantly be modified and strengthened if the depth of consequences is to be understood and, perhaps, averted. From the evidence increasingly available, to avert the dissolution of the foundations of the East African
pastoral formations would benefit not only them and the nation-states of which they are a part but also ultimately all human beings. Any attempt to achieve this entails a constant revision of the theory that guides research in the light of evidence revealed in the historic transformation taking place, partly as a result of policy interventions that have occurred and are occurring in the formations.

The research tasks are to differentiate in terms of labour allocation the ways in which pastoral formations handle the encroachment of commoditization and peripheral capitalism; to determine the relations between changes in the major means of production and class formation and the continuing ability of some production units to commit themselves to the pastoral mode of existence; and to examine the functional transformation of such structures as age-sets and descent groups as a critical aspect of the overall transformation of the relations of production in the continuing attempts by pastoralists to order their involvement with changes engendered by forces outside their direct control.

discussion

van Drunen: Your paper is entitled theoretical implications; yet it sounds as if you speak from evidence. Can you explain? Polarization is artificial and not a good approach; the groups are not either "pure" pastoralists (in fact nomads) or "pure" cultivators.

Rigby: I merely appeal for a better theorization of the nature of pastoral production, so that we can understand better the way in which the pastoralists are theoretically transformed. Pastoralists can become agriculturalists; however it is not simply a matter of shifting economic forms and retaining the same societies but a matter of fundamental alteration, not just of the means of production but of ideology as well.

Mpaayei: People between pastoralism and agriculture become part of the stress within the pastoral society. There is a struggle between the two for grazing and water. They compete for areas that are good for both. The changes of control over land have political implications, for pastoral peoples have little control over change, having no long-term planning.

Migot-Adholla: What is the role of the anthropologist in such planning systems? The findings among the Baraguyu, reported in Rigby's paper, that pastoralism represents the most efficient use of labour, suggest minimal government intervention. But suppose, as Croze and Gwynne indicate, that the most efficient use of land in most of Narok is for wheat production. How would the anthropologist advise the Kenyan government, which at the time may be faced with a national grain shortage?

Rigby: The point is well taken, but in my paper I do urge study of how pastoral peoples handle commodity relations and peripheral capitalism. I do not advocate leaving them alone, because history has not left them alone. But we must also understand how their unique social foundations allow them to apprehend and deal with the new relationships.

What are the implications of change? Pastoral labour, if of higher efficiency than cultivation, should be encouraged. Even though available land is becoming scarce, labour is the crucial shortage. Why not increase the productivity of labour rather than diverting it?
Bourgeot: Peter Rigby's theoretical perspective has a link to Marxism. However, there are a number of misunderstandings, notably with respect to the Germanic mode of production. Peter uses the concept in the spirit of Marxist analysis bound to the social formation that he has studied. It appears that it is not in this sense that the criticisms and divergencies previously expressed are founded. In effect, I ask whether the interveners have not unconsciously considered the mode-of-production concept to be like a simple sociologic category, emptied of its Marxian content. This lack of comprehension prevents use of the concept in the study of social evolution.

Salzman: The notion of the Germanic mode of production is anachronistic because of its crudeness, which ignores all the subtleties we now grasp. After all, virtually nothing was known at the time Marx devised the concept about pastoral systems, and our knowledge has vastly increased since that time.

Rigby: The concept is useful because it includes larger units and the role of ideology, whereas Sahlins, for instance, focuses on a domestic mode of production, which lacks these elements.

Awogbade: The mode-of-production notion is quite confusing. On another topic, the traditional mode of pastoral production cannot possibly supply enough protein.

Rigby: The concept of a mode of production is not descriptive but analytic. It deals with the role of class interests, for instance, which can be seen in the promotion of ranches in Kenya and Uganda (and at the state level in Tanzania). The pastoral system may well be the most effective way of using range resources. The productivity of pastoral labour is much higher than that involved in maize production, for instance. Cultivation is now on the increase, and we find a decrease in the productivity of labour. This is a process not of development, but of the reverse.
pasture in the malian gourma: habitation by humans and animals¹

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The central Gourma (Reichelt n.d.), situated between the 200 and 400 mm isohyets (Boudet 1979) and between the 15th and 17th parallels, experiences relatively high maximum and minimum temperatures throughout the year. The entire Malian Gourma houses approximately 130,000 nomads — four major ethnic groups, the Kal Tamacheq (Tuareg), Fulani, Moors, and Songhai.

I will deal with only the Kal Tamacheq and, to a minor extent, the Fulani. My aim is to elaborate, from a factual study, a number of proposals that go beyond the scope of the study and reflect a concept of development in nomadic societies, which are being subjected to economic and political constraints created by external factors.

The methods of the study were based on the need to analyze how these societies function, particularly with respect to the organization and use of land, as a key to the rationale behind the herders' management of their pasture. Understanding this rationale is indispensable to development operations, inasmuch as these operations are aimed — fundamentally and in a specific manner — at improving the living conditions of the herders. Improvement can be brought about only through political determination to preserve the individuality of these societies in all its forms (economic, social, cultural, etc.). However, this does not mean that the aspects that are indisputably unique to each society should be organized into a system. The nomad-herders are evolving within nation-states that should have the economic and political capacity to incorporate them into national structures without assimilating them. Attempting to achieve unity from diversity does not inevitably lead to antagonism. When it does, however, the antagonism is a result of the relationships existing between classes — relationships that are directly attributable to the nature of the power of the state. Any development project deriving from state power that perpetuates different classes would soon result in the appearance — in fact, the burgeoning — of a livestock bourgeoisie whose objectives would correspond to those of the bourgeoisie created by the state and the commercial sector (Bourgeot 1978). Any development effort conscious of this reality and contributing to it provides the engine for a machine eliminating nomadic societies. However, the word

¹ This paper was originally French and was translated by IDRC for inclusion in these proceedings.
“development” implies denial of the regressive position of advocating, in a utopian manner, the current conditions in these societies or a return to the past. These societies are now suffering from the destructive effects of an uncertain climate and of external socioeconomic pressures.

Thus, what is required is, on the one hand, a revival, or a resurgence, of the intrinsic capacities of these societies to respond to such pressures and, on the other hand, techniques (production, land management, institutionalization of authority, decision-making, etc.) that pave the way for interaction between the pastoral societies and the nation-states of which they are a part and that, thereby, foster their adaptability.

habitation and land use

the kal tamacheq (tuareg)

The Kal Tamacheq employ, as an important feature of their way of life, pasture whose boundaries are defined. These are known as ihenzuzagh and consist of lands occupied at different times by domestic groups with a common ancestry. Several groups with common ancestry may share pasture or may use different ranges that overlap. The ranges offer all the natural resources (plant life and minerals) required in the yearly cycle of pastoral or agropastoral production activities: fonio (Panicum laetum, or aseghal in Tamashak), millet, and salt. The domestic groups are in encampments of one or more conjugal families descended from collateral agnates, their numbers varying with the seasons. Each group keeps a herd of goats and a few milch cows that together (but particularly the caprines) constitute the main food supply. The minimum size of the herd is determined by the amount of water available for human and animal consumption. When the water supply grows short, the nomads split into smaller groups. Thus, the domestic units fluctuate in numbers but are nonetheless relatively homogeneous, combining production and consumption activities.

The domestic units often control agricultural “production units,” each of which is composed of a particular type of livestock. Their distance from the domestic units varies and depends upon the time of year and the livestock; they use pasture in a particular way, locating near ponds, whereas the domestic units live near wells or watering holes 20–25 km from the ponds.

2 Different terms are used for these units, depending on the number of tents they comprise: 1 tent, ehen; 1–5 tents, ihanan; 5–20 tents, amezzagh; 20–25 tents, aghiwanan. Fluctuations in the composition of these units are caused by seasonal changes and the quality and abundance of the vegetative cover.

3 This expression is used to stress the place and the form in which the major cycles of the pastoral production process occur. They are distinguished from domestic units in that:

• There is no network of kinship or alliance within the units, which include only the shepherd or shepherds;
• Household equipment is reduced to the bare minimum;
• They are characterized by greater mobility;
• They are not a focus of social life; and
• Livestock is raised for purposes that differ from those of the domestic units.

Of course, this distinction of a social and economic nature between the two types of units does not imply that no production takes place in the domestic units.
These specialized production units are set up only after a certain number of animals have been acquired. In other words, when a family has one or more of these production units, it means that it owns (or is responsible for) a relatively large herd. Once a herd exceeds a hundred head, one or more of these production units must be set up. The Kal Tamacheq have two types of production units, ovine (arokob) and bovine (asedjan; plural isedjan).

The ovine production units are managed by servants who are monitored weekly by a member of the domestic unit, unless the production unit is too far from the domestic unit, in which case the monitoring is done on a monthly basis. Managing an arokob requires intense work, particularly with respect to surveillance of the flock because sheep often graze at night and rest during the day. Moreover, a constant watch must be kept against predators.

The bovine production unit requires more specialized skill than that required for the ovine units. The isedjan, which require tighter control, are generally managed by a couple who are related by blood or marriage to the owner of the unit.

Together, these units make up an agricultural entity whose composition changes, its flexibility and fluctuations being determined by the number of livestock. An agricultural unit means a unit with an internal organization enabling it to reproduce. It has a set of technical, organizational structures for the use of land and for pastoral production and simultaneously condenses social structures of production at the level of the domestic unit and its dependants. Because of ecological constraints, it is necessary to dig wells to relieve the pressure on the biotopes where isedjan herds graze.

Under this system, the use of space varies with the seasons. During the rainy season — wintering (akasa) — humans and animals move from pond to pond and then pool to pool until the water has dried up. During this time of year, the domestic units abandon the wells in favour of the ponds and pools.

During the postwintering period (gharat) in November, when all the watering holes have dried up, all the units move away from the pond, forming concentric circles around it. The production units are always located behind the domestic units so that the pastures near the pond are not ravaged and overtaxed. No grazing is permitted in the area between the domestic units and the pond, and the domestic units with milch animals are separated from those without such animals. The latter are mainly poor nomads, the social considerations clearly influencing land use and spatial disposition.

There is a social hierarchy with respect to land use, based on particular ecological conditions. It derives from the social relationships of production. The spatial disposition is a result of the distinction made between camps that have milch animals and those that do not; moreover, it involves different access to water sources. What is noteworthy about this disposition is that the pond is not overtaxed because the domestic units with few milch animals move away from the pond and use a well; the production units water their animals at the pond even when the well has a high output. However, the Kel Serere (vassal warriors), the Kal Antassar (practitioners of maraboutism), and the Arabs\(^4\) use wells to water the herds of their production units.

In the hot season, particularly when food is in short supply, use of the remaining biotopes is placed under vigilant and democratic control by the

\(^4\) The last two come from the Haussa bank of the Niger River and are accustomed to watering at deep wells.
society. Social hierarchies and relationships of domination are tempered — although not eliminated — by the ecological conditions. In other words, the uncommon scarcity of natural resources results in relative equality between people with respect to access to these resources. However, this phenomenon is counteracted by the inequality of the size of the herds and by the social position of the rich owners. In any case, a hierarchy with respect to the use of pasture never exists in the hot season.

In the hot season, all changes of location are first agreed upon by the leaders of the various domestic units who, at the beginning of the season, have decided to unite (nadjedehet: “let us be on the same level, equals”), at least for a short time. This temporary equality, which is proof of a desire to conserve scarce natural resources, results in rigorous social control, although it does not eliminate competition for access to biotopes. In other words, competition takes place within a system of social control that neutralizes it and imposes respect for decisions made by the leaders. Those who hold power still “push” the other production units aside to gain more space for themselves, but all the units, whatever their size or social rank, stay in a horizontal line. This strategy for the use of space demonstrates the capacity of nomadic societies to conserve and share natural resources.

The principle underlying the organization and use of space is this distinction between the sojourn pastures, constituting a reserve, and the transit pastures, controlled by the production units. As the dry season wears on, the transit pastures expand to take in the sojourn pastures, as an inner tube expands when inflated.

There are two main reasons that grazing is done on the periphery:

- To avoid overtaxing the pastures by the successive and constant driving of herds across them to the watering hole; and
- To save the strength of the animals that will fetch water for human consumption.

This arrangement is a result not only of the need to conserve pasture but also of the length of time needed between waterings. Far from being the disorganized system of management of which nomadic societies have often been accused, this system is an indication of their desire to conserve pasture.

The use of land surrounding the production units is organized according to the animals’ watering schedule so that the area is not congested. Small livestock and cattle are watered every 2 days, whereas the camels require water every 3 days in the hot season (in the cold season, they can go without water for a month).

Distinguishing between two types of pasture — the tahenchechereq, which are access routes and pastures between the production units and the watering hole (known as transit pastures), and the iseкла (known as sojourn pastures) — enables the herders to maintain a precarious balance of pasture. Moreover, the horizontal alignment of the production units is conducive both to social control and to the protection of the iseкла.

This strategy is to keep the herd in the best possible health during the period of food scarcity, which is May and June. It demonstrates that there is a rational, nonanarchic use of land that is in keeping with a collective system of appropriation of natural resources. However, the system has been upset — although its validity not questioned — by the interference of external factors: economic pressure, the introduction of capitalist-type market relationships, the rise of competition, administrative reorganization, drought, etc. It follows
that the ecological imbalances have been brought on not by the type of natural resource ownership (collective appropriation of pasture) but rather by external pressures. The contradiction between private ownership of livestock and collective appropriation of the natural resources is prevented from having its full impact by the nature of the social relationships of production, which are based on a hierarchical use of land, a type of use that is in keeping with the class structure of the society (Bourgeot 1979).

A development strategy aimed at bringing about a state of consonance between private ownership of the herd and collective appropriation of natural resources by making ownership of the latter private would only transform the contradiction into antagonism. A change in the type of ownership would inevitably result in conflict and the impoverishment of most of the herders for the benefit of the richest of them, thereby establishing the basis for a capitalist class structure.

The use of land by humans and animals, insofar as sources of water are concerned, is based simultaneously on the composition of the vegetative cover, the types of livestock being raised, and the season. Soil conditions have created two types of pastures, resulting in a specialized use of the ecosystems, depending on the characteristics of each. In some pastures, where the soil is sandy (bodera pastures), the aerial vegetation consists of *Euphorbia balmasifera* (known as *taghalt* in Tamashék), the fruit and leaves of which can be eaten by all the animals,⁵ *Acacia tortilis*, and *A. senegalensis*, and the herbaceous vegetation consists of *Blepharis linariifolia* (known as *efaghe* in its green state and *ekaney* when dried), *Zornia glochidiata* (*tekament*), *Cenchrus biflorus* (*takana* or “cram-cram”), and *Alysicarpus ovalifolius* (*tafarkest*). In the colluvial gullies of the areas with skeletal soil where strips of woodland alternate with sparse vegetation (the *isalwa*; singular, *asa/wa*), *Schoenefeldia gracilis* grows. These areas are used mainly as grazing land for cattle and serve as such for up to 2 or 3 months after the rainy season. However, if there is a storage of water, the cattle graze on the bodera, the sand-dune pastures.

As a general rule, the smaller livestock graze on whatever types of vegetation are left by the cattle, but the cattle may, if necessary, eat types of vegetation that they would not eat if there were plenty of food. The herder, particularly in the case of the Kai Tamacheq, very seldom interferes with the livestock’s diet, except for facilitating the cattle’s access to *Cenchrus biflorus* in the rainy season to increase milk production.

There is rotation or shuffling of the various types of livestock with respect to grazing on the sand-dune pastures and in the colluvial gullies. This, however, is a result of the palatability of species. Cattle do not eat all types of vegetation, and this results in some species’ being left for the smaller livestock. This selective use of the biotopes’ vegetative cover, based on the palatability of species, is an example of how the cattle and the smaller livestock complement one another and is a factor that is considered in the setup of the agricultural units.

It seems that the distinction — which is a flexible one — between the sand-dune pastures and the pastures with sparse vegetation exists only in the rainy season. At other times, the determining factors are the palatability of

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⁵This information, given by the herders, is contradicted by the experts, who claim this bush is toxic.
vegetative species and the existence of watering holes. The consumption pattern shows that human influence on the plant life, which is exercised indirectly through the animals, is very minimal: the tending of the herd, as a production technique that characterizes one aspect of animal domestication, involves following the herd rather than directing it to selected grazing lands. The herder watches over the animals but does not lead them, and this raises two questions: What set of criteria may be used to define the idea of “animal territory”? And what is the part played by humans in establishing a balance between the herd and natural resources?

The chief technique used by the Kal Tamacheq (as well as by many other herders moving about in different climatic regions) as a means of stabilizing a herd on unfamiliar pastures is the introduction into the herd of animals accustomed to these grazing lands. In this way, the shepherd takes advantage of the gregariousness of the herd, giving the new animals a leadership role. The second technique is the provision of mineral salts (salt licks) that make up for dietary deficiencies and satisfy the nutritional needs of an animal. These adaptive techniques are used with every kind of livestock.

In the case of herds from the Haussa shore (left bank) of the Niger River, physiologic adaptation requires an entire year.

fulani

The structuring and use of space by the Fulani herders differ notably from those of the Kal Tamacheq. During wintering (July—September), the domestic units (uro; singular, sudu), made up of old people, the sick, and a few dairy animals, are positioned around the ponds, whereas the production units (tchudi sukabe), made up of children, able-bodied adolescents, and the herds of cattle, are found beyond the domestic units. This setup continues even through January — that is, the same separations exist between domestic and production units, although the “inner tube” expansion takes place between November and January when salt curing activity is intensive.

During the dry season (February—May), the domestic units (uro) and the production units (sukabe) merge into a horizontal line, the domestic and production units alternating. The uro and sukabe are not governed by a specific spatial arrangement, which means that they represent an organic, cooperative unit that is both more compact and more diversified than in the case of the Kal Tamacheq.

In the dry season, the cattle range on colluvial pastures (gorwal), which include the areas with sparse vegetation (the iselwa of the Kal Tamacheq) and the whole hydrographic network comprising the main medullary canal and its affluents.

An example of this use of space is provided by the Gelgodji Achami Fulani, who move nomadically in the area of the ponds of Ebanghimellen (the white ponds). The autumn sand-dune pastures surrounding these ponds are used only in March, April, and May. The greater part of the herd (the sukabe), making up the production units, grazes on the colluvial pastures.

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6 Medullary is the literal and figurative translation of the Tamashek word aduf. The term’s first meaning is a marrow bone, and it is also used to designate the canal linking the ponds. The Kal Tamacheq distinguish the iselwa, colluvial valleys that may be found up to 2–3 km from the canal, from the aduf, the medullary canal proper.
(the gorwal) before returning to Gossi in March to use the sand-dune pastures (the seno) of Ebanghimellen. This pattern applies to all categories of livestock. Contrary to appearances, it is not the existence of fields that causes production units to wander farther away, but the location of palatable species and the composition of the vegetation, in particular, the presence of Panicum laetum, the different varieties of Aristida, and various forest species in the form of leaves lying on the ground.

The pattern is, therefore, a natural migration to conserve the sand-dune pastures used by the Fulani for a few weeks, that is, between the 7th day following the first rain and the earing of the grain. This conservation of the seno (sand-dune pasture) is a result of both a specialization of biotopes and the palatability of species.

The Fulani’s use of the ecosystem helps to illustrate the existence of two distinct types of nomadism in identical ecological conditions. The chief difference lies in the absence among the Fulani of the very marked distinction that is found among the Kal Tamacheq between the isekla and the ihenchechreq (or tahenchechereq) grazing lands. This distinction seems not to be determined by the herd’s watering rhythm but by a concern for preserving the pastures. The Fulani and Tamacheq have the same watering rhythm: once every 2 days. In other words, the herd spends one day grazing and the next day it goes to drink.

Hardly any grazing is done on the trip to the watering hole. The distinction between isekla and ihenchechreq pastures cannot apply in the case of the Fulani because, in the hot season, the domestic units (uro) and the production units (sukabe) are combined. Furthermore, grazing begins at the pond and the herds, all units mingling, exhaust the surrounding pastures.

This brief comparison only touches on the differences between the two production systems; it points to a need for a more exhaustive and systematic analysis. A twofold competition, at times violent, takes place between the Fulani and the Kal Tamacheq over access to pastures.

competition

The Kal Tamacheq, like the Fulani, prefer pastures that have not been trampled (called ementaziwut or asafu pastures). The competition to arrive first at untrampled pastures is also found among the many factions making up the Kal Tamacheq ethnic group, although in this case it is controlled by the social relationships of production.

Because the Fulani do not organize their space or manage the use of land in the way that the Kal Tamacheq do, they systematically practice a strategy aimed at securing unspoiled pastures. The balance of power, based in this situation on the number of head of cattle and the stubbornness of the shepherds, is in general held by the important cattle herders, the Fulani. Thus, the common expression is “If the Fulani are there, the Tamacheq pass behind them.”

The rights of those who arrive first are rooted in custom and recognized by a consensus that cuts across ethnic groups. If grazing land is left unused, the reason is either that feline predators are present or that watering points (watering holes, wells, or ponds) have disappeared. Whatever the reason, the pasturage is appropriated de facto by the person or persons responsible for getting rid of the problem. However, if an individual or group is able to dig a well or watering hole after watering points have disappeared, the verbal
permission of the group that originally occupied the territory is required before the land can be grazed. This authorization is not accompanied by a fee of any sort.

These examples are important because they underline the fact that any development action that neglects the legal forms of land appropriation and control will provoke either social conflicts or uncontrollable overloading of grazing land. There are many examples of such failures — the hydraulic policies adopted in Niger, are one — failures that leave their mark on development operations in nomadic societies. Under practically identical ecological conditions, the Fulani and Kal Tamacheq methods of land use and organization vary — a finding that supports the theory that these conditions are not the determining factors in the method of spatial organization. Kal Tamacheq society is profoundly hierarchical and based on Bedouin pastoralism, which is characterized by conquest with the aid of the camel (Bonte 1975). In this society the political organization establishes and regulates conditions for access to natural resources. Fulani society is much more egalitarian, the members practicing a type of nomadism based on the raising of bovines; it has political structures that permit more equitable access to natural resources. Furthermore, spatial organization depends to a greater extent on requirements associated with the herd and derived products, milk production in particular.

Contrary to a commonly held opinion that the relationship between the nomad and nature is anarchic, it appears that land is organized along technical and social lines (Bulletin production pastorale et société 1980), although there is flexibility in the use of natural resources and no well-defined or strict concept of territoriality.

Land is organized along technical lines because production involves the use of techniques that direct human efforts toward animals, the principal intermediary between the nomad and nature’s resources.

Land is subject to social organization because the use and structuring of space is the result of social relationships of production that incorporate the ideological notion of space.

improving conditions of natural resource use

Nomadic pastoralism is often cited as being archaic and unprofitable; it is even considered a burden on various governments committed to the economic development of their countries and their integration into the capitalist-dominated world economy.

The social, economic, and ecological conditions of the Gourma are such that none of the proposals that follow would be completely satisfactory. Nonetheless, the proposals are aimed at checking social and economic deterioration and tangibly improving the living conditions of these peoples. They are based on an examination of socioeconomic data that attempted to determine:

- The level of development of local forces of production;
- The weak points in the system of land use; and
- Real and practical possibilities for action by the herders, who are the chief agents of their own development.

This approach involves a description of the social conditions of the region and an interpretation of them. The resulting recommendations are all
aimed at introducing adaptation and transformation into the prevailing systems of land use and pastoral production. These processes are the best suited, from a social and economic point of view, to improving the living conditions of the herders and agricultural pastoralists of the Gourma. At the national level, political will to make lasting improvements in the Gourma is essential and has been lacking thus far — a fact implicit in the herders’ criticism: “You, the experts, all ask the same questions; you drink some tea and milk, and then you go home. But we see that nothing happens.”

There is a multiplicity of studies carried out by a host of organizations working for the most part on the same problems. Coordination — perhaps through a roundtable discussion of those responsible — for these studies is necessary to produce a synthesis. The formulation of an overall plan for regional development that fits into the national plan is clearly called for.

To date, such studies have produced reports but no action; the result is that the herders feel they are the “poor relations” of the country and many experts no longer know what purpose their work serves — a result that leads to a feeling of alienation.

My proposals deal with only two of the components of the grazing land ecosystems — humans and natural resources. The third element, the animals (the intermediary between the nomad and the vegetative cover) should be the subject of further research. The proposals are, first, to introduce a coherent policy of deepening existing ponds and, then, to regulate their use in a manner consistent with the production systems of the primary producers, the nomadic group. Social and sociological mechanisms can be designed to ensure the smooth implementation of these changes.

deepening of ponds and hydraulic policies

The existence of a rational system of land use — an organic, coherent structure — does not imply that the Gourma must remain as it is. On the contrary, the ordered management of the land and the existence of appropriate social rules do no offset the contradictions or exclude the need for certain projects.

The basic principle governing water consumption by the livestock is the use of surface water until it is depleted. Then, the herds drink from watering holes, and the nomads as well as goats and some dairy cattle use wells or watering holes. The use of water from precipitation and subterranean water corresponds structurally to the methods of land organization and utilization. It is clear, then, that a hydraulic policy focusing on the drilling of wells would not be in keeping with actual conditions in the Gourma. Contrary to prevailing opinion, widespread drilling is unnecessary for three reasons:

• Water extraction techniques are seldom used by the natives of the Gourma. In general, the herder—pioneers who have dug wells are from the Haussa bank where these techniques have been fully mastered because they are used daily;

• These techniques involve effort, labour, and thus the expenditure of human energy, which immediately raises the problem of nourishment. A greater output of human energy requires a proper food intake; and

• Drilled wells are not in keeping with the traditional methods of resource utilization and management or production organization in the Gourma.
Drilling, while not to be rejected outright, can only be complementary—that is, secondary—to pond improvement. Drilling should be undertaken in areas lacking ponds. Several wells exist in the northwest of the Gourma-Rharous, precisely in an area where there are no ponds, but not south of the Niger River, which is used as a pond. Under these conditions, the existence of these wells, located between 15 and 30 km from the river, makes it possible to maintain the sojourn pasture—transit pasture distinction. Thus, there is a relationship of complementarity (pond—well or watering hole) that must be preserved.

In addition, the drilling of wells would not lessen the pressure on the ponds. Furthermore, there is the problem of pulley devices often being controlled by security officers (guards). Quite frequently, nomads cannot gain access to these “monopolized” wells without resorting to threats or graft. In 1972, two men were killed in a dispute over access to a communal well. Thus, social control over access to subterranean waters is a real problem. As for privately owned wells, every visiting group must ask permission to water its livestock from the owner or owners of the well and make a payment, in money or in kind, that is good for a year. The payment made by a “tent chief” is proportional to the size of the herd to be watered—approximately 5000 Malian francs (MF) per 100 head of livestock. In both cases, the possibility of conflict is present.

Ponds are a completely different matter because they are utilized and managed collectively. Each pond is divided by social usage into watering sectors corresponding to the end points of the transhumance orbits of the groups using the same grazing range. This sectoral allotment of water from precipitation does not create conflicts.

Given the situation, it would seem advisable to implement a sensible policy of deepening ponds together with some drilling of wells to complement the ponds. Clearly, the deepening of ponds will not make them perennial, but their period of use will be extended so that new, previously ungrazed, pastures can be opened.

A policy of pond deepening accompanied by some selective well drilling would make it possible to maintain the present conditions of land use without giving an advantage to rich livestock owners. The new watering points would mean that a certain number of pastures, previously unused, could be opened, thereby leading to a better distribution of livestock. To achieve these aims, a technical operation must respect the organization of the vegetative cover into isekla pastures and ihenchechreq pastures.

The ponds chosen for deepening must be located not more than 40 km apart. Otherwise, there is a danger of major imbalances being created in the organization of the cover.

The deepening of ponds does not alter the transhumance orbits but rather makes it possible to stabilize them. Poor management, however, may lead to overloading problems following pond improvement.

The advantages, in sum, are stabilization, relief from overloading, and natural regulation of grazing lands. In addition, the deepening of ponds can be done by the nomads themselves, using simple techniques. This technical aspect stimulates the active and direct participation of the Gourma pastoralists. However, there is no question of categorically and systematically rejecting the possibility of drilling wells in areas served by ponds. A policy for water development cannot be technically oriented but must be based on the socioeconomic practices related to land use and pastoral production.
techniques (water extraction, herding, fonio, salt cure, and so on) that characterize these nomads.

As ponds are allocated by sectors that bring together a certain number of groups, pond improvement must involve joint efforts and widespread participation by all the social classes (former nobles, vassals, marabouts, the Bellah, the Fulani, and so on) so that the funds invested in the project would have an immediate effect at the local level.

The possibility of a dam should not be rejected. The construction of the In Alata dam, for instance, was greatly appreciated by herders because it not only revitalized the valley below but also resulted in the opening of a number of pastures that had previously been inaccessible.

regulation of grazing land

Far from being a panacea, a system of grazing controls faces three potential obstacles:

• Opposition of an ideological and religious nature;
• Poor bureaucratic decisions made by technical services that are ill-suited to pastoral production conditions; and
• Corrupt practices by rich herders.

The ideology advocated by the marabout groups, whose political weight and influence should not be underestimated, holds that controlled grazing results in a period of drought and that it creates a situation in which private appropriation of pastures takes place. The latter concern is related to the third obstacle: the rich herders are quite prepared to offer heifers to a few administrators as bribes to obtain the grazing rights to restricted pastures. In addition to this bribery, there is always the temptation, for these administrators, to let their own herds graze on the restricted land. Because abuse of authority is a fact of life, it must be taken into consideration.

The second obstacle is manifest in restrictions of access to a 45-km-wide strip along both banks of the Niger River for a distance of 200 km. Regardless of the dates and duration of such restrictions, they likely stifle pastoral activities, provoke harmful antagonism, and lead to a concentration of certain groups to the south of this horizontal strip and thus to overloading and deterioration of the vegetative cover.

Such policies, underlining the legitimate concern for preserving the areas adjacent to the river, should be accompanied by a measure of flexibility corresponding to the adaptability of the nomads’ conception and style of life. For instance, access channels to the river could be created so that the nomads can obtain the water essential to the salt cure of the animals of central Gourma. A given number of groups would have access to these channels as partial control over the concentration of nomads caused by this decision. The establishment of a schedule — regulations on dates of access — and a rotation system would also help. Furthermore, this sectioning or interlarding in the system of controlled grazing would not disturb the social composition of the groups or their transhumance ranges.

Finally, restrictions on pastures cannot be systematically issued for set areas; they must be adapted to local water supply conditions and to land-use methods. To implement the system of restrictions, officials would have to conduct a stock-taking of resources halfway through the wintering period; at the end of wintering (in September), decisions concerning restrictions for
certain places should be made. The intention behind this system is to rely on the flexibility and active participation of all the parties concerned — the herders, the administration, and the technical services personnel.

pastoral policies and codes: social and legal changes

pastoral units

Defining the ecosystems of grazing lands, a complex and delicate task, implicitly presents the problem of defining pastoral units. An unconscious but relatively frequent error is to take into account the nature of the vegetation alone. Such an approach is a study of the biocenosis rather than a study of the ecosystem, which includes socioeconomic factors. For example, the method of utilizing natural resources is determined not only by the constraints of the physical environment but also by those imposed by sociocultural and historical factors. The bioclimatic framework alone, encompassing several phytogeographic units, is inadequate to define pastoral units.

Efforts to set up pastoral units meet with a series of obstacles: first, the nature of the customary land use of nomads; second, the types of appropriation governing the use of land, according to the various kinds of economic activities; and third, the subdivisions of administrative districts. These three factors overlap and produce dialectic interactions that considerably complicate the problem. What then are the criteria, isolable or otherwise, that may be used in defining pastoral units?

The realities of the Gourma point to the impracticality of advancing a criterion that, as an invariable core uniting common elements, would satisfactorily cover the three factors. There is neither correspondence nor structural equivalence between the notion of territoriality — the space needed for pastoral production — among the nomads and the administrative units. The same territory may be used by groups that are socially dissimilar, have different political statuses, and belong to networks of families and alliances having no common bonds. However, technically and from the point of view of a local pilot experiment, the setting up of a pastoral unit may prove advantageous, provided it is accompanied by a pastoral code.

pastoral codes

In view of the studies on the methods of using and organizing land and society's control of it (social and political structure), it seems appropriate to propose the development of a pastoral code specifically for the peoples of central Gourma. The legal provisions of this code should be the subject of a special study, but some suggestions are possible at the outset. Such a code would have two objectives:

- The assumption of control, by the herders themselves, of the organization of their land and of land improvement projects; and
- The introduction of one or more institutional frameworks for action (land improvement, management, approval, and so on).

Underlying these objectives is the desire to return to pastoral communities the powers of which they have been stripped in the course of history so that they can take their destiny into their own hands. The intention here is to avoid reducing a pastoral code to nothing more than a legal code based on
Western or Roman law. Although in Western societies, legal authority acts and operates in an autonomous and specific manner, in a pastoral society legalities do not constitute an autonomous authority but are integral elements of the social system (economic matters, access to resources, management, and so on).

Thus, the pastoral code must not be reduced to a mere administrative tool. Administration should be part of the terms and conditions of the code, as should a description of the economic philosophy and the social relationships of production. Past experience with other Tamacheq political groups and with the Gourma makes it clear that there is no real economic autonomy and that the economy, in so far as the orientation of production is concerned, is not yet free of family, religious, and symbolic constraints, even though in the last few years new, commercially oriented production techniques have been appearing. These innovations call for special attention and analysis because they indicate the transition from one type of economic philosophy to another.

The purpose of this digression to refer to production problems is to point out that a concept of development must take into account the working mechanisms of these societies and the way of thinking of the individuals who belong to them, which is conditioned by the status of the individual within his or her social structure. In other words, the development of these societies must be founded on their internal vitality if it is to succeed and result in the satisfaction of their real needs. However, in nearly all cases, the activities of development organizations and concerned countries are of a technical nature. These efforts remain limited and confused and are directed toward a goal other than the satisfaction of the needs of the herders.

The pastoral policies introduced by present governments belong to one of two classes (Bourgeot 1972):

- Bureaucratic pastoral policies, which attempt to organize pastoral production according to a model shaped by the dominant theories of the group in power. In actual practice the objective, which may not be acknowledged, is to introduce a process of sedentarization rather than to work toward a real development of nomadism. Such policies accelerate the disappearance of the specific character of ethnic groups when they should, instead, promote systematic efforts to develop pastoral values by actualizing them; and

- Anarchic pastoral policies, which develop along the lines of the free-trade economic model and often imply an absence of pastoral policy inasmuch as there is no political dialogue concerning pastoralists. In this connection, the hydraulic policies in the Sahel should be mentioned. Furthermore, the development of nomadism is often blocked by international agreements that contribute to its decline. The free-trade model leads to a concentration of efforts and investments (in the form of assistance, loans, grants) that are best suited to animal production and conform to the standards and interests of capitalism. This strategy impoverishes the poorest groups and neglects frontier — but nevertheless exploitable — areas. A solution more in line with the interests of the herders is to diversify and expand the use of the land.

Finally, a pastoral code could be linked to the notion of the moral code (siasa-n-tamezuq) and could create or maintain a structural equivalence between the pastoral societies and the nation-states.
institutional frameworks for action and the future of rangeland ecosystems

Plans for combatting drought must be framed for the long term, and, consequently, a global, not a piecemeal, reorganization of the rangeland ecosystems and of pastoral production is required. This reorganization, the urgency of which is dictated by the prevailing conditions of pastoral production and the present state of the vegetative cover, must involve the active participation of, and the taking of responsibility by, the herders in close cooperation with specialized organizations and experts in different fields (Bourgeot 1978).

The solution does not lie in a program for technical and institutional development centring on the nomads or with their approval but in a program that gives them the means of taking charge of their economic and administrative affairs. These means must be based on their community structure and be employed in collaboration with other government authorities.

community structure: the transhumance council

At present, the social organization, a result of political and administrative decisions, and the existing community structure are socially relevant: they are the structures through which decisions are made, disputes of all kinds are settled, and respect for the traditional transhumance orbits is ensured.

Because several groups normally travel together through social custom, the management of their grazing sites could be left to transhumance councils, which would be made up of herders elected from the groups that wander together. These councils would be responsible for managing and improving the geographic areas used as grazing by the groups. Setting up transhumance councils is a measure extending the active and direct influence of the herders over the biocenosis (natural conditions of production: water, pasturage, minerals) and over the required improvements.

Some means of coordinating the efforts of cooperatives and herders with regard to livestock consumption and movement should be found. There is a relation of structural equivalence between cooperatives and the existing administrative districts, whereas the members of the transhumance councils would belong to several districts. The coordination could nevertheless be carried out through the marketing function assigned to the cooperatives.

The introduction of transhumance councils would be in line with the idea of a human investment put forward by government authorities, and furthermore, with the native concept of a moral code of behaviour based on social consensus.

Out of respect for the social and human realities of the Gourma, stress must be placed on the capabilities of the herders and on their readiness to undertake and execute what they are asked to do, provided the impetus is given by the central authority. Therefore, it is basically a question of showing the political will to achieve something in this region.

Rationed grazing in the dry season is already more or less traditionally respected through the leaving fallow of pastures located between the watering point and the encampments. These are moved progressively farther away from it, remaining aligned and keeping a fair distance from each other.
Through the transhumance councils, community projects to improve the grazing lands could be implemented.

These councils could set the stage for a revival of traditional ways of thinking, ideas and practices that, for various historical, political, and social reasons, have been stripped of their substance. They would also reintroduce an inherent vitality into the working mechanisms of the societies and strengthen social cohesiveness, which has been weakening. Such a policy treats nomads as active agents, not passive objects, of their own development and paves the way for an adaptation—transformation in natural resource utilization without changing present production conditions. The economic vigour of a society manifests itself in and through the functioning of its own particular institutions and governing bodies. Finally, the establishment of these councils would lay the groundwork for cooperation between traditional authorities with their own particular values and the administrative institutions of government. The cooperation might take the following form:

- The administration convenes the transhumance council;
- The council puts forward proposals (land protection policy, places, dates, reasons, and so on);
- The administration appraises the proposals and gives or withholds approval; and
- The administration and the herders assume responsibility for the implementation of the decisions.

the intercommunity land and council

Certain locations (salt cure sites, ponds, fonio fields, etc.), which are in an especially poor state, are claimed by groups belonging to several transhumance councils, in other words, different pastoral communities. These "strong points of pastoral production" (the expression used by Gallais 1975) need to be socially regulated so that access to resources can be controlled. The same considerations that underlie the introduction of a moral code could lead to the creation of an intercommunity council made up of herders elected by the transhumance councils. Such elective representation would preserve the forms of collective appropriation and transform the terms for the use and management of these strong points. Any other kind of control might end in private sectoral appropriation, leading to conflicts. Access to these strong points must be socially codified.

In an article on the subject of pastoralism in Morocco, Ali Gharbi (1980) describes how the movement toward private appropriation of collective grazing lands has led to uprisings and violent repression. For example, the Azita peasant uprising in the north of the country started when collective rangeland was seized by a few rich owners who had thousands of head of livestock grazing there under the protection of the militia. A translation from Ali Gharbi is noteworthy:

This is not the first time that grazing lands have been seized by large owners. There were the rural exoduses in 1959 (in Rif), in 1971 (in the Gharb), in 1977 (in Amlizmiz), and in 1979 (in Temara). This policy is impoverishing the peasants who are forced to emigrate and swell the shanty towns or to hire themselves out (at 6 dirhams per day) as agricultural labourers.
Although the context is different, the basic phenomenon gives rise to conflicts that take various forms. Nevertheless, the appropriation of lands under the protection of the militia underlines the interference of the state and its machinery to promote the convergence of the class interests of those who belong to this apparatus and the peasant bourgeoisie, including the pastoralist bourgeoisie.

management of land not used for grazing

Like other regions, the Gourma contains pasturage that is not used, the chief reason being the lack of watering points. In cases where the deepening of ponds and the digging of wells could open these lands, the problem is to decide how and by whom these improvements will be made. The nature of the system of land tenure and the method of allotting new pasturage must also be determined, for example:

- These potential grazing lands may be considered collective, indivisible property, a concept based essentially on the types of collective ownership that exist among the nomads; or
- These lands may be officially declared state property to which the herders would have usufruct. But under what conditions?

The former possibility would appear more favourable to the herders and, furthermore, is compatible with the development of a management strategy for the grazing land ecosystems. Turning over these pastures to communities responsible for their management would signal a commitment to making herders active agents of their own development, freeing them from their current role as passive spectators.

Even in the best of cases, the use of public lands for grazing may lead to deterioration and overgrazing. Proposals to institute a tax for access to public pasturage in fact would favour the richest herders and reinforce their wealth, thereby aggravating social inequalities. In the interest of the people of the Gourma and for the sake of integrated regional development, the actual allotment of these grazing lands must be left in the hands of the nomads.

All of the proposals put forward specific ways of modernizing stock-raising adapted to local conditions and, furthermore, call for integrating the pastoral production of the Gourma into the national economy and national plan. The new social and legal mechanisms and the institutional framework for supervising development would exist side by side with the institutions of the central government. These proposals also emphasize that the growth of pastoral productivity and integration at the national level do not depend solely on the adoption of policies and decisions of a technical nature.

The creation of public land holdings would change ownership relationships and have the effect of dispossessing the nomads of a part of the pasturage to which they do not yet have access. This unused land, however, falls within their social control. Furthermore, state jurisdiction sanctioning a new form of ownership might in the end cause intergroup conflict. In this connection, the example of the Algerian steppe is particularly instructive and enlightening. In the 19th century, the transformation of land ownership on the steppe through the creation of public land holdings led to strict regulation of nomadic areas. Nomads were restricted to migration corridors, and the result was a reduction in traditional grazing land (Renault-Benmiloud 1980).
The creation of state land holdings might also mean that potential pasture would be used for endeavours other than pastoralism.

This article is an attempt to synthesize two reports done in 1978 and 1979 in the Gourma of Mali, commissioned and financed by the Comité lutte contre l’aridité en milieu tropical (LAT) (the committee to fight aridity in tropical areas) under the DGRST (Direction générale de la recherche scientifique et technique). The reader who would like more detailed information, in particular concerning development proposals, should consult my two socioeconomic reports (July 1978 and April 1980). These may be obtained from the secretary of the Comité LAT, DGRST, 35, rue Saint Dominique, 75007 Paris. This committee has also published a synthesis of the pedology, agrostology, and social economics of the central Gourma. (Barry, J.P., Boudet, G., Bourgeot, A., Celles, J.P., et Lebrun, J.P. 1980. Etude des potentielles pastorales et de leur évolution en milieu sahélien au Mali. Action complémentaire coordonnée. 112 p.)

discussion

Salzman: Whereas externally imposed constraints can make a national productive system impossible, it is also true that national pastoral productive systems operating without externally imposed constraints often involved considerable predatory expansion and raiding. Thus, pastoral rationality can lead to negative consequences for neighbouring peoples.

Bourgeot: Nomadic pastoralists are not predators by nature. On the contrary, they have a rational system of land management. As for aggression, of course it exists, but we need to analyze its history. The examples in West Africa are revealing: there, the restructuring of the societies and the development of commercial culture that resulted from colonization provoked a restriction of the pastoral domain and disturbed the system of social control over pastoral space. Political control over water sources had a catastrophic effect on pastoral land use.

Horowitz: What point did you make on grazing reserves?

Bourgeot: Overgrazing occurs around the banks of rivers; pastoral access to such areas should be restricted.

Horowitz: Are these areas of annual or perennial growth? If annual grasses dominate — as in most of the Sahel — there is little reason to preserve them from one year to the next, or even between seasons, as their nutrient quality declines remarkably during the dry season.

Salih: You appear to be talking about areas where there is grass but pastoralists are unable to use it because of lack of water. If there is rainfall enough to support grazing, there must be pools on the land. Where there is no rain, the pasture is poor. By investing heavily in water resources, one only improves the pasture close to the water points — a step that aggravates the problem by creating overgrazing. This would be especially true if you accept my original argument that the pastures were originally poor; lack of water and inadequate pasture usually go together.

Aronson: There is a difference between project design and implementation. Bourgeot’s notion of returning decision-making to the pastoralists was
designed by AID for use in Niger, but the Niger government was wary about implementing it.

**Sandford:** Bourgeot's paper dealt with organization, but he had less about implementation. Whether different ethnic groups are to be part of the same councils, for instance, is a question of implementation he does not address.

**Aronson:** The AID project in Niger faced that issue: the Fulani were invited in to take Tuareg-claimed water rights, which was called sharing. The answer is not just to turn projects over to the central managers but to experiment in various forms of cooperation.

**Awogbade:** In Nigerian grazing reserves, 35 Fulani clans are using the same resources, and the government has formed cooperative committees. But the government does not allow Fulani actually to take part in these committees. Attempts to introduce grazing rotation have failed through lack of markets in those areas; yet pastoralists' participation, which would facilitate their cooperation, is not yet allowed.

**Bourgeot:** The Fulani–Tuareg relationship poses a true problem to which there is no special solution. There are three factors in change:

- Development must be based on the social structure of the herders;
- The reason for inadequate response lies in the weak point in their own social structure, the lack of high-level political will;
- The technological base for development is necessary.
education for nomadic pastoralists: development planning by trial and error

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Consistent with an ideology of development that sees the underdevelopment of pastoral peoples as a result of mental deficits, government efforts to assist pastoral peoples in Kenya tend to centre on prescriptions for education and training of a formal or informal kind instead of more direct economic interventions. The participation in educational schemes among pastoral peoples in Kenya is low for economic reasons, and schemes like livestock development projects either do not go far enough or are circumvented by more privileged groups or individuals. Pastoral peoples are therefore not fully integrated into the market economy. Because of this, they lack the necessary monetary resources to send their children to the educational facilities like primary boarding schools that the government ostensibly put up for them at great public expense. Most pastoralists are unable to afford the school fees that are charged at the boarding installations, so these facilities remain either underutilized or, in many cases, filled by children from the relatively more endowed agricultural districts of the country.

history

It has been suggested that the contemporary socioeconomic status of East African pastoralists should not be seen simply as that of societies that have fallen behind in the process of development or that have rejected change. Rather it should be seen as the culmination of dramatic reversals in the fortunes of pastoral peoples. From a time when pastoralists were the dominant force in East Africa in the early 19th century, the tables have been turned, and today pastoral societies are impoverished, dominated, and underprivileged (van Zwanenberg and King 1975).

In Kenya, reversal of the fortunes of pastoral peoples came in several steps. First, the early Europeans and the colonial government that they set up were extremely biased against pastoralism. Their biases were voiced at every opportunity and in many instances were translated into policies that worked against pastoral societies.

Such views were given credence and sanction by crude, racist anthropology that propagated many myths about the sociological correlates of pastoralism. In a critique on the views, Rigby (1969b) said that there
seems to be general agreement among laypeople and social anthropologists that pastoral societies are more conservative and resistant to change than are societies with mixed or fully developed agricultural economies. The causal links between pastoralism and conservatism are held to be of two kinds: the first concerns adaptation to harsh environments and the second has to do with the intensity of values about livestock in these societies, usually summarized in the phrase, the cattle complex (Schneider 1959). The so-called conservatism among pastoral peoples was explained merely in terms of factors internal to these societies. In other words, such positions explain that pastoral peoples are conservative because they are pastoralists! Such attempts are no more than mere tautological arguments.

Even tautological arguments are not to be dismissed, however. During the colonial period as in the period following independence, such views played a central role in perpetuating the exploitation of pastoralists in all spheres of Kenyan life. Moreover, such views are also to be seen as part of the ideology of a particular historical epoch and the social relations pertaining thereto. Hence, the strong equivocations by the British officials 1 are not to be understood as merely a form of bias against pastoralists but rather as part of a wider ruling-class ideology of the time.

During the early colonial incorporation, according to historians, the British found administration among the nomadic pastoralists rather "inconvenient" as a result of many clashes and difficulties in "pacifying" them. Even more importantly, however, the European farmers were fearful of any competition from African pastoralists in the livestock market. Thus, they succeeded in curtailing any meaningful government livestock improvement schemes in the pastoral areas. In fact, historical restrictions on African pastoral development can only be understood in relation to the positive emphasis that was placed on European stock development (van Zwanenberg and King 1975). Moreover, persistent fears that African animals might infect European stock with disease led to the enforcement of endless quarantine periods in the African areas. As a result, it became illegal for pastoralists to sell their animals across "reserve" boundaries. Quarantine regulations restricted the supply of meat and, in turn, kept the prices very high for European livestock producers.

The erection of artificial boundaries between ethnic groups ostensibly to maintain law and order resulted in a static division of the land and water resources. It froze a situation that was hitherto fluid and fundamentally changed the existing ecological balance between humans, animals, and

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1 Some recorded examples: "... it might seem as a gross piece of interference when we say that the native must be necessarily restricted in his pastoral tendencies. To such I distinctly state the best interests of the natives are studied when they are restricted in such inclinations and are compelled to take to mixed agriculture. Among all African tribes excessive pastoral proclivities more or less influence nomadic or unsettled conditions in their life." This statement by C.M. Dobbs (van Zwanenberg and King 1975), the Nyanza Provincial Commissioner, 1914, was supported by Governor Belfield, who said, "I deprecate in the strongest possible way the suggestion that pernicious pastoral proclivities should be encouraged by the grant of any right for grazing purposes. My policy is to discourage such proclivities by every legitimate means, not only because they are productive of nomadic tendencies but because they inculcate in the minds of people a distaste for any settled industry" (van Zwanenberg and King 1975).
natural resources. The changes resulted in a series of vicious circles that influenced the underdevelopment of pastoral peoples still further.

The effects of the colonial government’s policies in the pastoral areas were manifest in land shortage, overpopulation, and overstocking that in their turn led to much soil erosion. The government’s response to these developments was destocking. The pastoralists’ reaction was to raid each other for better grazing land and water. The vicious circle was completed and set in train again when the government responded by imposing its control through *Pax Britannica* in the pastoral areas.

After Kenya’s independence, the dominant attitudes toward the pastoral peoples cannot be said to have changed much. Among junior and senior government officials and technocrats one still hears the paternalistic clamour about the need for pastoral peoples to lead a more sedentary existence and sometimes even to engage in agriculture. The natural bias toward sedentary existence and agriculture is a result of the preponderance of officials and other change agents from the agricultural districts in the pastoral areas. As in the colonial days, official and unofficial perorations are couched in such a way as to imply that to become “modernized” pastoral peoples have to be weaned from their debilitating “cattle complex.” In the popular press, these sentiments are represented in such persistent themes and cute stories as “Who says the Maasai and their cattle can’t be parted” (Anonymous 1978).

To that end, many small projects, like minor irrigation schemes, are encouraged and launched with much fanfare. Not even subsequent reports of crop failures are enough to deter these ad-hoc efforts.

The Kenya Livestock Development Project initiated in 1970, however, appeared to be a more serious government undertaking to uplift the conditions of the pastoral peoples. The officially stated goal was to make life in the pastoral areas more “... attractive and to promote the necessary capital formation to further employment potential and alleviate rural population pressure” (Lele 1975:204). Even if the yardstick of these officially stated objectives were used to measure the success of the government’s efforts, it is doubtful whether one would conclude that the livestock development project has gone very far in altering the basic conditions of the pastoral people.

The livestock project involved the development of commercial, individual, and group ranches in certain areas of Kenya’s arid and semi-arid landscape: the Maasai districts of Kajiado and Narok, the rangelands extending from the south of Naivasha Town in Nakuru District to Baringo District in the North, and in the Taita-Taveta, Tana River, and Kilifi districts of the Coast Province. In the more marginal districts of the Northeastern Province (Garissa, Wajir, Mandera), the livestock development project involved the setting up of grazing blocks.

The project, assisted by the World Bank and a number of other international organizations like AID, cost U.S. $11.7 million up to 1974. A second project, costing another U.S. $59.7 million, was to be added to enlarge and extend the earlier effort. Overall, the livestock development project was supposed to assist or support some 2500–3000 ranchers or pastoralists (Lele 1975).

By 1972, 30 commercial, 8 company, 39 individual, and 25 group ranches had been financed. Loans to commercial ranches averaged U.S. $46 000. For company, individual, and group ranches the average loans were U.S. $106 000, $5570, and $4250, respectively. The development of
grazing blocks involved direct grants rather than loans. Total investment in the blocks was expected to be U.S. $1.5 million (Lele 1975).

The World Bank evaluation of these livestock schemes reveals several things. First, contrary to government hopes and expectations, the schemes had a very low employment potential. It was estimated that the substantial loans that were disbursed would generate additional employment for only 400 persons on commercial ranches and only 422 on company ranches. Loans to individual or group ranches were not expected to create additional employment opportunities but only to support the existing pastoral population (Lele 1975).

Second, the government's effort concentrated on a small geographical area. The arid areas include 190,000 km$^2$ that receive between 250 and 500 mm of rain annually and 156,000 km$^2$ with less than 250 mm. The target number of 2500–3000 ranchers or pastoralists among a population numbering in the millions can only be seen as a drop in the ocean.

Third, and perhaps most important, is the doubt that such huge amounts of money went to help the people for whom they were officially intended. If it can be reasonably shown that they did not, then the impact of that gesture toward the development of pastoral peoples can easily be discounted.

Collins and Lappe (1979) indicated that 87% of the World Bank's contributions were granted to only a few ranchers. As is usual in development ventures in developing countries, those funds probably went to a few people with influence and connections. Siphoning development funds is part of what has been dubbed straddling (Cohen and Kinyanjui 1977) — that is, the practice of senior officials who use their state influence to accumulate in the private sector or to deflect public development funds into ventures in which they are involved.

Uma Lele (1975:204), an economist of the World Bank who evaluated the Kenya Livestock Development Project, uses a classic Robin Hood argument of the Bank to justify the rationale that so much money went to benefit only a few people: “the tax revenues generated from these ranches are expected to help the government provide rural services to other needy areas.” In the light of contrary evidence, much of it provided by Uma Lele herself in the evaluation for the World Bank, all this goes to show is that, as a development agency, the World Bank has not begun to question, let alone give up, its theory of multiplier effects. The same appears true for the Kenya government. In the meantime, economic development in the country's pastoral areas continues to be the subject of regular official perorations. As for the pastoral peoples, they continue to exist at the periphery of the Kenyan society — impoverished, dominated, and underprivileged in all spheres of life.

educational participation in the pastoral areas

The development of schooling in Kenya has been bound inextricably with missionary work. As is well known, however, missionary work concentrated largely in the predominantly agricultural districts close to or adjacent to the settler enclave. This was the central band of the country forming the Kenya highlands and the surrounding districts as well as the western lakeside region of the country neighbouring Uganda. There was little or no missionary activity in the wide expanse that forms the abode of the
nomadic pastoralists. Moreover, restricted movement in the pastoral areas as well as the colonial government's obsession with law and order left no room for undertakings such as educational development.

At the time of independence, the possession of educational credentials almost exclusively determined and justified selection to elitist positions at both local and national levels. This emphasis meant that pastoral peoples were effectively shut out of leadership positions. They did not have a strong enough voice even in matters that concerned their own development. A belief in the relationship between education and development and the power of education as a panacea for individual and societal problems grew up throughout Kenya, and the school enrollments in agricultural districts boomed. The low educational participation rates in the pastoral areas began to be regarded as a serious political problem that needed immediate attention. The government's incentives in this regard started with the waiving of tuition fees in the primary schools in the arid and semi-arid areas. When this did not elicit much response in terms of increased enrollments, the government recommended boarding schools. The Development Plan, 1970–74 (Kenya, Government of, 1970), speaks of the government's concerns:

All areas of Kenya, particularly those with widely scattered populations, have not participated equally in the recent rapid expansion of primary education. Less than 50% of the total primary school age population are enrolled in schools in Baringo, Samburu, West Pokot, Turkana, Kajiado, Narok, Wajir, Mandera, Garissa, Isiolo, Marsabit, Tana River, and Lamu districts.

In most of these districts, enrolments will have to rise very rapidly in the next [Development] Plan period [1970–74] if the country is to reach the national target of 75% of the primary school age population enrolled by 1974.

As these districts are among the poorest in the Republic, Government will encourage primary school attendance by providing boarding facilities in each of the mentioned districts. Government will also survey these districts and, where necessary and practicable, improve and extend existing facilities.

With the exception of Lamu, Baringo, Elgeyo-Marakwet, and Kajiado, which seem to have exceeded the government projection of 75% of primary schoolage enrollments (6–12 years), the districts mentioned in the 1970–74 Development Plan were way below that expectation 8 years later. In fact, in 1978 only 1% of Turkana's eligible population was estimated to be attending school. The figures for other areas were only somewhat higher. Moreover, recent research (Nkinyangi 1980) shows that there is even reason to doubt the statistics for districts that were reported to have exceeded the official projection. Official figures are heavily inflated by upper primary repetition, overage children, dropouts, and interdistrict migrations of children to take advantage of the boarding school program, the government's single most important intervention to raise enrollments and improve school attendance in the pastoral areas.

As hinted in the 1970–74 Development Plan, the government decided to implement the policy of providing boarding schools in the arid and semi-arid districts of the country. I (Nkinyangi 1980) visited these installa-
tions in 1978–79. By the time of the 1974–78 Development Plan, the government (Kenya, Government of, 1974:142) was already expressing disappointment in the boarding school program it had initiated:

During the 1970–74 [Development] Plan Period, the government attempted to encourage primary education by providing boarding facilities at selected schools in these areas. The experience to date is that the cost per pupil has been extremely high and the actual response has been disappointing in terms of increased enrolment by people indigenous to those areas. Therefore, the government will reduce the scope of this particular programme substantially until its effectiveness has been demonstrated. The government, however, intends to test alternative means of providing education in these areas. A new programme of mobile teaching units specially designed for areas with these particular problems will be tested during the [Development] Plan period. The government remains committed to the long-term goal of increasing the educational facilities in the remote, sparsely populated areas to the level of more advanced parts of the country. However, it recognizes that its scarce resources must be utilized with maximum effectiveness.

Because the government used the elements of cost and the regional origin of enrolled pupils to question the effectiveness of boarding school installations, my analysis concentrates on these two aspects. The government lamented that the cost per pupil had been extremely high in the boarding schools. What the government really meant is that the cost of these installations, otherwise officially dubbed low-cost primary boarding schools, was high in relation to the ordinary community-supported day primary schools that dot the Kenya countryside. It seems as if planners and policymakers wanted to introduce special facilities for pastoral children while at the same time hoping to keep the cost down to the level of the regular primary school. Laments over costs aside, the government statement does not mention that the state also supports two other types of boarding schools ("medium-cost" and "high-cost"), which not only cost the government much more to run (Table 1 and 2) but whose social justification is hardly convincing. One would think that in a situation of scarce resources, such institutions would be geared toward those who need them most.

Medium-cost boarding schools arose to fulfill the needs of the richer peasants and other more privileged classes in the rural areas. High-cost boarding schools are the institutions that existed in the settler enclave to serve the children of the Europeans. After independence, the ruling classes appropriated them for their children. In a number of rural areas, private boarding institutions have also arisen to serve the educational needs of the nascent classes of middle and rich peasants. The continuation of a stratified school system whether in differentiated boarding school facilities, or more generally in the existence of different school types serving different social classes, is testimony of the continued social differentiation in Kenya society (Nkinyangi 1980).

The government subsidy for the high-cost boarding schools is at least twice that for low-cost primary boarding schools in the arid and semi-arid areas of the country. However, a look at the magnitude of costs in even the low-cost schools leaves one completely dumbfounded as to how pastoral parents, who were earlier excused from paying tuition costs of Ksh. (Kenyan shillings) 20–60 in the interest of increasing enrollments and improving
Table 1. Estimated parental costs and amount of government subsidy per child in Kenyan primary boarding schools, 1978.

<table>
<thead>
<tr>
<th>Financial contribution</th>
<th>Costs (Ksh.) in different boarding school types</th>
<th>Low-cost</th>
<th>Medium-cost</th>
<th>High-cost</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuition</td>
<td></td>
<td>60</td>
<td>60</td>
<td>579</td>
<td>200</td>
</tr>
<tr>
<td>Boarding fees</td>
<td></td>
<td>180</td>
<td>600</td>
<td>1800</td>
<td>1375</td>
</tr>
<tr>
<td>Building fund</td>
<td></td>
<td>200</td>
<td>200</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td>School fund</td>
<td></td>
<td>-</td>
<td>50</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>Equipment levy</td>
<td></td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Activity fees</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Caution money</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>Domestic science fees</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>Hospital deposit</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>30</td>
</tr>
<tr>
<td>Boarding materials</td>
<td></td>
<td>200</td>
<td>300</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>School uniform</td>
<td></td>
<td>200</td>
<td>600</td>
<td>900</td>
<td>1050</td>
</tr>
<tr>
<td>Diocesan fund</td>
<td></td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Watchmen fees</td>
<td></td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Government</td>
<td></td>
<td>600</td>
<td>600</td>
<td>1240</td>
<td>-</td>
</tr>
</tbody>
</table>

*Figures for tuition fees, boarding fees, building fund, equipment levy, activity fees, caution money, domestic science, hospital deposit, and school fund were derived from interviews with parents, teachers, and Ministry of Education officials; figures for the cost of boarding materials and uniforms in high-cost and private boarding schools are based on interviews with school-appointed suppliers and outfitters. In some schools, such items are provided as part of the overall fee paid by parents. In low-cost and medium-cost boarding schools, these figures are estimates derived from interviews with local shopkeepers where parents obtain such items and materials. The amount of government subsidy to the different school types was obtained from interviews with Ministry of Education officials.

school attendance, could now be expected to pay such higher costs (while at the same time continuing to fulfill the government's expectations).

It can also be argued that the official supplements for the privileged boarding school system would in fact be much higher if one considered other kinds of government support given. Table 2 shows the estimates of other government expenditures in primary boarding schools of different types. It should be noted that, although the support given to the medium- and high-cost schools is phenomenal, the only allocation to low-cost schools serving pastoral children is Ksh. 600 per child. With that comparatively little amount, these schools are expected to purchase food, equipment, hire subordinate staff, and so on. Moreover, in the low-cost schools, the children were expected to bring their own beds, bedding materials, and cutlery. When I remarked to a number of education officials about such imbalances in the allocation of government support, they responded with quite straight faces that this is necessary to maintain high standards (in the high-cost schools) and that in fact it is the government's ultimate intention to uplift standards in all boarding schools to that of high-cost schools!

The government complained of low participation rates in its boarding schools, particularly in terms of pupils indigenous to pastoral areas. However, the statement did not explain why. In fact, the authors of the
Table 2. Estimates of government expenditure in Kenyan primary boarding schools, 1978–79.3

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Low-costb</th>
<th>Medium-cost</th>
<th>High-cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonteaching executive staff</td>
<td>-</td>
<td>1887</td>
<td>8752</td>
</tr>
<tr>
<td>Nonteaching subordinate staff</td>
<td>-</td>
<td>2988</td>
<td>5682</td>
</tr>
<tr>
<td>Tuition equipment and stores</td>
<td>-</td>
<td>-</td>
<td>1878</td>
</tr>
<tr>
<td>Boarding equipment and stores</td>
<td>-</td>
<td>10500</td>
<td>13200</td>
</tr>
<tr>
<td>Internal transport and travel</td>
<td>-</td>
<td>300</td>
<td>800</td>
</tr>
<tr>
<td>Board of governors’ claims</td>
<td>-</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>Electricity/gas/water</td>
<td>-</td>
<td>900</td>
<td>5940</td>
</tr>
<tr>
<td>Uniforms for subordinate staff</td>
<td>-</td>
<td>360</td>
<td>2050</td>
</tr>
<tr>
<td>Maintenance and improvements</td>
<td>-</td>
<td>440</td>
<td>2400</td>
</tr>
</tbody>
</table>

*a Ministry of Education, Nairobi, provided the figures, which are for three boarding schools representing the three boarding school types: low-cost (Bura, Garissa District); medium-cost (Michinda, Nakuru District); and high-cost (Kitale, Trans Nzoia District).

b £30 (Ksh. 600)/child each year. The government allocates £30 and £62/child each year in medium- and high-cost schools respectively besides paying for the services shown here.

document make it sound as if it is explainable in terms of pastoral peoples' reluctance for social change: "... a substantial proportion of the population in these areas is not yet fully aware of the social and economic benefits that result from the education of their young people" (Kenya, Government of, 1974:142).

I believe this explanation is deficient and is part of the ideology that seeks to blame the victims. During the colonial period, this ideology was used against pastoral peoples. After independence, it has been used either as an apologia for past inaction or as a rationalization of half-baked official policies. Lack of development of the pastoral peoples’ main economic resource, livestock, makes it difficult for them to participate effectively in endeavours that require monetary outlays. Behind this, lies an explanation of the pastoral peoples' inability to pay the relatively exorbitant school fees and meet other costs in participating in the boarding schools set up for them.

In many of the low-cost schools that I visited, I found the boarding fees and other incidental costs (beds, bedding, cutlery, etc.) to be serious hindrances for the smooth participation of pastoral children in these installations. Contrary to what is popularly held — and particularly the rationale advanced by government apologists — I did not find pastoral peoples' interests and concerns for their children’s education to be any less expressed than for the other parts of the country.2

In many of the schools, I found serious problems in not only the procuring but also the transporting of food. In 1977, all the boarding schools in Turkana District had to be closed for lack of food. In one boarding school

2 For Kenya, the most significant differences in educational aspirations and expectations are on social class lines. Pastoralists and peasants who are close in terms of class lines have similar aspirations for their children's education.
in Garissa District, the kitchens had been equipped for cooking gas but without provision for its procurement from Nairobi. The headmaster of this school therefore spent much time soliciting community assistance to gather firewood for the school kitchens. Needless to say, this often resulted in soured relations between the school and the community, not to mention delayed meals and canceled classes.

Field investigations also indicated that there were many dropouts from these boarding schools during the year because of the problems connected with high educational costs and other difficulties encountered in the schools (Nkinyangi 1980). Investigations in more than half of the existing low-cost boarding schools also showed that there were many pupils (sometimes to the tune of 15% of enrollment) from other districts (often the agricultural districts) enrolled in these schools (Nkinyangi 1980).

Restrictions on upper primary repetition and the competitiveness for secondary school selection were forcing droves of children from the agricultural districts to transfer to the pastoral districts for their repetition
year, preempting spaces in the schools meant for pastoral children. To facilitate this process, many agriculturalists’ children even went as far as changing their names. The directions as well as the magnitudes of these interdistrict migrations pose serious policy and political questions. In school-flow statistics, the migrations are shown as negative dropout rates, meaning that more pupils transferred into the educational system than were registered at the beginning of the year.

The fact that many of the boarding schools were catering for children not indigenous to the pastoral areas is also shown by data I obtained in the field. During the 1978 school year I gathered information on boarding capacity, enrollment, and percent of pupils from outside the district or catchment area in a number of boarding schools (Nkinyangi 1980). The data revealed not only that the majority of the low-cost boarding schools were not working to capacity but also that they were not catering to the pupils for whom they were set up.

I found that the competitiveness in secondary school selection and official curbs on repetition in the upper grades of primary school are at the base of much interdistrict migration of pupils. Also, many myths have been propagated about the ability of these schools to certify pupils for secondary school selection. It is generally thought that because these schools board pupils, cost relatively little for the more endowed parents and workers, and are in remote areas, the pupils have fewer distractions than elsewhere and can dedicate themselves to the rigours of the secondary school selection examinations. However, when I matched a number of low-cost boarding schools with a number of low-cost day schools in different districts on their abilities to prepare pupils for secondary school selection in 1975–77, I found no objective differences between these two sets of schools catering to the lower social classes in Kenyan society.

At the base of interdistrict migrations of pupils is the desire not only to improve selection chances for secondary school but, more specifically, to take advantage of the compensatory policies existing in the pastoral areas. The aim is first to enter boarding facilities and second to exploit preferential selection procedures that have been introduced to enroll pastoral children in secondary schools. This explains why it is no longer unusual to find children from the agricultural districts in the pastoral districts.

conclusions

I have shown that policies enacted to assist pastoral areas to catch up with other areas of the country in the educational field cannot be said to have worked. The fees charged in boarding schools as well as other incidental costs make these installations, which were meant for pastoralists, positively closed to the majority of children indigenous to those areas. Moreover, the discovery by people in the agricultural districts that they can exploit these institutions to further their children’s chances in secondary school selection undermines the government’s compensatory policies in a most direct way and, in effect, contributes to the continued exploitation of pastoral peoples.

Even though the ability of the low-cost boarding schools to prepare pupils for secondary school selection is much exaggerated, children from other districts in these schools are sometimes mistakenly accepted to government secondary schools as representing a quota of pupils indigenous
to pastoral districts. This contributes to a very serious reversal in the present and future fortunes of pastoral peoples especially in a society in which educational credentials are at the base of social mobility and self-advancement. The full political ramifications of these developments are not yet evident but can be expected to emerge in the future.

Of particular concern in the prospects for improving the social conditions of the pastoral peoples is the general picture of planners and policymakers. It portrays government efforts in the pastoral areas either as being ad hoc or as being largely based on trial and error. Analysis of policy incentives to improve educational access and school attendance in the pastoral areas presents contradictions that, in microcosm, summarize social relations in the Kenyan society. It also demonstrates the prevalent official ideology that seeks to blame the victims for the failure of official policies. Because there is never a clear notion of what is to be done, planners' and policymakers' enthusiasm seems to oscillate from one untested proposition to another. First there is a waiver of nominal school fees, then the introduction of boarding school facilities. There is a temporary disillusionment with boarding school facilities. There is a temporary disillusionment with boarding schools and then a momentary flirtation with the idea of mobile schools. Finally, there is a rediscovery of the efficacy of boarding schools. The World Bank has agreed to finance another 12 such installations at Ksh. 60 million (U.S. $750 000), this time not only to serve as regular boarding schools but also to provide a "supermarket" of nonformal educational prescriptions for pastoral peoples—all this without any serious evaluation of why the boarding school program has not performed well thus far.

The notion of mobile schools is a good example of ad hoc, trial and error planning. This innovation was to be just what the name implies—schools on wheels. From the scanty details that I have been able to put together (World Bank and UNESCO experts were unusually reticent about this intervention and were not willing to be credited with its origin), specially equipped mobiles were supposed to traverse the rangelands with pastoralists. Quite apart from how many mobiles might be needed to serve such a large expanse, this innovation assumed that there were motorable roads and pathways to follow and that pastoral peoples followed predictable routes. The poor planning is coupled with elitist policies, for there is no valid social justification for the existence of middle- and high-cost primary boarding schools in Kenya. Enough high quality schools exist to serve the privileged strata of the Kenyan society without supplemental boarding installations financed from taxpayers' contributions. These schools are plainly a waste of scarce resources and a social scandal, especially when so little is spent on parallel boarding schools meant to raise enrollments and improve school attendance in the pastoral areas. I recommend that such elitist boarding schools be closed immediately and that the funds be used to uplift the conditions in the so-called low-cost boarding schools catering to pastoral children.

To justify the presence of large numbers of agricultural children in boarding schools that are meant to cater to pastoral children, some officials argue the value of breaking ethnic composition of schools and promoting "national unity." I believe such arguments are another official apologia for the fact that few pastoral children are utilizing these facilities. The case for national unity is especially weak because the process of interaction or pupils' migration is unidirectional. Public boarding schools should be for children...
who need them most — that is, pastoral children. Therefore, government should initiate urgent action to ensure that school and boarding places meant for pastoral children are not preempted by relatively more privileged children from other areas of the country. Also it should waive fees for the pastoral children, as levying such fees is tantamount to doing nothing in the first place. However, in the long run, the pace at which pastoral peoples can participate in education will be determined by developments and improvements in their economic domain.

**discussion**

**Sihm:** Education is an area in which anthropologists should become involved. But I don’t think labour requirements and costs are the major factors that limit enrollment in schools. If the pastoralists really want their people to have services such as schools, they will find the means, for in fact pastoralists are not poor. What keeps children away from schools is the curriculum; you are offering a primary school curriculum, teaching them about a society they don’t really have much interest in. I wonder whether you shouldn’t concentrate on nonformal training, such as vocational education, which teaches them something they need. Pastoralists in our education system get knocked on the head, being told they don’t know anything (“you can’t even do arithmetic”), although they in fact come in with knowledge that even if we studied half our lives we wouldn’t achieve.

**Nkinyangi:** I am not an anthropologist, and perhaps there are people here who can say why government incentives have not worked. But on the aim of education my position is quite clear: a conventional education is a fundamental right. People who are not literate are exploited in various ways.

**Soos:** We’re sidestepping the issue a little, because few farmers go back to farm after they are educated. In development projects, there has always been an attempt to institutionalize the organization; if you find pastoralists who can begin to take over administration, you’re ahead of the game in understanding and reacting to the problems.

**Willby:** I would like to return the discussion to Salzman’s question of whether there is still room for research in education in the pastoral context. There are controversial issues that warrant study by anthropologists, especially the purpose of education and the relevance of the curriculum to the subsequent life of pastoralists. As soon as they have completed the initial postindependence task of redressing imbalances in development, developing countries should cautiously question the relevance of their educational systems to their development ends. Pastoral societies, to survive, must surely have more educational requirements than reading and writing.

**Salzman:** One issue that must be considered is ethnic differences between pastoral populations and the larger national population, for the educational system is designed by and for the larger population. In Iran, for example, pastoral peoples such as the Baluch, the Lurs, the Turkmen, the Kurds, the Qashqai have languages, cultures, and identities different from those of the majority Persians. So when children from these minorities come into the Persian school system, they are at an immediate disadvantage — indeed, a double disadvantage, because the education in another language, about another culture, history, and way of life, provides them with little they can
take back into their society and use. We must thus consider education that facilitates mobility for some (so that pastoralists have representation in the national leadership) and provides knowledge relevant to the local society. It is necessary to avoid assimilation on the one hand and ghettoization and immobility on the other. Such education might be based more on local language and culture in the initial stages and develop toward the national culture in middle and later stages. In this way, children who, after the initial stages, leave to participate in local life will have gained relevant knowledge; others will go on and develop qualifications to admit them to national society.

Mackie: Health services to pastoralists have been dealt with unsatisfactorily by most governments. They are generally offered from a distant fixed facility and do not use beneficial traditional health practices that exist.

Mpaayei: Dr Nkinyangi is trying to be objective. The fundamental problem of education with pastoral people, judging from the experience of my own Maasai, is changing their attitude by creating something they believe in. Most pastoral people are not looking for a handout; such an attitude is repulsive to them. What they want is something they can really participate in as their own, right from the beginning. In colonial days I was a district education officer, and I had fundamental problems. First, I had to fight against an attitude that blocked Maasai from getting an education like anybody else in Kenya. It was a very cunningly devised policy: a district commissioner would come and say, “Now you Maasai people, you are the only ones in Kenya who have been able to continue your culture. You have control of your children; you have not permitted them to go out and become like other groups; you’re a great people, you’ve done this.” And then he’d turn around to the chiefs and say, “Look, you sent only four children to school last year. Now this year you’ve got to bring 10 children.” And every chief was immediately ordered, as a tax, just to remain chief at all, to bring in so many children. The chiefs started looking at one another and cursing the DC in his presence (of course he didn’t know Maasai). The thing was the children came, but the whole community worked together to obstruct the DC. The children were going to school only to follow the order. The schools were never filled, right through the colonial period. I looked at the whole thing, and I realized what was happening. I was sent in 1958 to Kajiado, an area of 21 000 km². They had had five primary schools for pastoral people for 40 years, using this system of compulsion. I realized that there was something wrong, so as education officer I went around every single community, every group that watered cattle together, and in 3 years I opened 11 schools, built with the cooperation of the chiefs and the community. For the first, the community gave Ksh. 26 000.

Problem number two: when I tried to introduce girls’ education, I became unpopular. I ignored it and went ahead. It took 10 years, from 1949 to 1959, to be able to open the first primary school for Maasai girls.

In these last 3 years, I have personally opened 10 primary schools — bush schools — in Kajiado and Narok. I’m still doing it, and now the people have realized what I’m doing, and I have more work than I can cope with. I wish the World Bank would sympathize; there’s no problem in educating the people. The day before yesterday I went 30 km south of here not to start but to accept, officially, the sponsorship of a new project. Because they saw what I was doing, the people went ahead of me. They built a two-classroom school and a teacher’s house; they put 50 children in school, and then they sent
word to me to send them an evangelist to teach them about Jesus Christ. I went officially on Sunday to accept this project, and I accept the responsibility of teaching them. That was the second group to do that. I say to them, "I want to do something to give these children a future. Who is going to be the owner of this school? Who is going to be the father of this?" And immediately somebody volunteers; he says, "All right, I'm not too busy; I'll do it." It is that kind of herder who has been responsible for the whole project from the beginning. And by the end of it, it belongs to them.

What I'm saying is this: it's the whole attitude, the whole approach, toward pastoral people that's wrong. People begin by assuming these people will never change. And so they bring in things, sometimes consciously, sometimes unconsciously, that completely antagonize the people and stop them from helping themselves. And this is what I've been trying to fight for 30 years. I assure you it's a tough battle.

Finally, let me mention medical work. In Maasailand, every January and February is a terrible time because of drought, famine, and all the rest. It's also the worst time for disease because the resistance of the people has gone down. In the famine of 1976–77 when we lost a lot of cattle, a New Zealand doctor came with his family to help my people. We treated more than 4000 people in 2 months in the projects I was working in. If I only had a doctor — I've got that kind of work available all the time.
the economics of pastoralism
Pastoralists' main concern is with the well-being of their animal capital.
An understanding of pastoral systems has long been inhibited by general notions that the pastoralists' animal husbandry was governed only by customary choices rather than by economic constraints. In particular, apparent maximization of herd sizes, low rates of offtake, and hoarding of unproductive animals led many to characterize pastoral culture as "irrational" and "conservative." More recent study of herd structure and demography, the demands of subsistence production, household production, and the constraints of herd management has supported the systematic and logical nature of pastoral practices. Pastoral economic systems, however, are part of larger economic systems, and market forces, educational pressures, resource competition, and labour migration fundamentally influence the pastoral system.

Dahl suggests that researchers study the pastoralists' views on the technical aspects of their own economy, and she explains the rationale behind livestock exchange, certain forms of herd structure, species mix within the herd, stock mobility, herd dispersion, and herd maximization. Schneider takes exception to Dahl's assumption that pastoralism is a subsistence activity and asserts that livestock represent capital and that the transformation of traditional livestock production into a beef industry runs counter to traditional pastoralism. Hopcraft, in contrast, asserts that development of a commercial livestock industry is necessary and depends on incentives for individuals so that they will not maximize the number of their herds, a phenomenon called the "tragedy of the commons." This view was criticized by many who pointed to internal conservation of common resources, but it is widely influential as a rationale for livestock development schemes. Broch-Due, Garfield, and Langton note that any study of pastoralism must take into account women's role in the economy and that analysts must consider their biases toward women if they are to anticipate negative effects of development programs on this group. Ag Hama's contribution discusses the development of commercialization among pastoralists of the Sahel, and Bahhady describes the profound influences of commercialization on the Bedouin of Syria, including increased sedentarization.

The anthropological perspective views economics as related to higher-order social systems, whereas the economic perspective in anthropology looks to individual calculations about livelihood as the essential unit of analysis. It appears that, whereas certain activities such as pastoralism can be usefully examined in themselves, it is ultimately necessary to scrutinize the effects of regional and cultural factors. The debate on the applicability of the logic of the "tragedy of the commons" to pastoral resource use illustrates the difference in perspective between those who develop systemic macro accounts and those who advocate accounts of individual decision-making.
production in pastoral societies

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Early social studies of pastoralism — mainly pursued by anthropologists — focused on pastoral values and attitudes rather than on the pastoral economy, and thus an understanding of the pastoral economy has been slow to develop. The result is that the popular image of pastoralism is still largely marked by stereotypes of pastoral irrationality, conservatism, and "the cattle-complex" — traits that are used to explain pastoral behaviour such as the hoarding of animals or the "perverse supply–response" to market prices.

During the last decade, anthropologists, but also geographers and other social scientists, have spent much effort on trying to put pastoral behaviour into a more complete context. One way is to emphasize production and economic aspects. In such an approach, the pastoralists' values are important, for they govern the goals of production and consumption and the orientation of people's lives. But pastoral practice is also governed by a body of general cognitions about risks and more specific technical knowledge of soils, water quality, botany, animal diseases, and meteorology. And, fundamentally, pastoral activities are restricted by the material constraints such as access to labour, to basic natural resources (e.g., pastures, water, and minerals), and to the most effective mix of animals in herds. The pastoral society revolves around the problems of reproduction, care, and distribution of such resources. Therefore, an analysis of the pastoral society should begin from such a perspective. In other words, even if social and cultural behaviour is not directly dependent on an economic base, it may be fruitful to scrutinize the relation. This type of approach to culture has been dominant recently in "pastorology," partly because "more than peoples with other adaptations, nomads are limited and conditioned in their social organization and culture by ecological factors. . . ." (Salzman 1967:121).

However important ecology has been historically, its importance in shaping pastoral modes of life is on the decline; the political and economic place of the pastoral society in a wider national and international context is, in my opinion, more important for the future of pastoralism.

When studying pastoral production, many "pastorologists" who have a social anthropological background have, like me, felt compelled to deal also with purely technical problems of pastoralism to a larger extent than is traditional within the discipline, feeling that sciences in the pastoral field have for a long time neglected research on the grassroots' conditions of pastoral husbandry. Before the Sahel drought, the more technical sciences seemed
wholly uninterested in challenging the anthropologists' monopoly on pastoral studies. The one positive effect of the drought has been a change in this attitude. However, commercial interests still govern much of the agricultural research carried out in the tropics, either by directly financing it or by influencing its orientation toward production for the market. Granting of funds for basic research into improvements in subsistence production has obviously been neglected — a fact that is easily seen from the bias in husbandry and veterinary publications where the proportion of pages devoted to milk production from goats or the difficulties of camel-rearing are minute compared with the writings on beef cattle. A typical example is a camel research program recently launched by the International Foundation for Science in which the explicit object of the steering committee was to enhance the position of the camel in commercial production.

The reason for anthropological dominance in the field of "pastorology" can partly be traced to the fact that the discipline is almost unique in making it an academic merit to share somebody else's living conditions for a while (even if this in practice is only superficially done). However, I am happy to note that at least some more down-to-earth studies of pastoral production now seem to be under way particularly here in Kenya — I am thinking of studies such as those undertaken by David Western among the Maasai but also some of the research started in the Turkana and Marsabit areas.

A certain type of research for which I think there is still a need is that of pastoral ethnoscience. Sheer descriptive studies of ecological classification systems, ethnobotany, etc. do not receive much academic acclaim but are urgently needed. They are needed both to establish a reasonable platform for communication with pastoralists and to give proper appreciation of the pastoralists' substantial mass of useful knowledge. One may argue that such studies are not the business of anthropologists, but one cannot deny that it is their active duty to interest botanists, animal husbandry personnel, etc. in these fields.

I do not necessarily think that anthropologists should shy away from technical matters. As long as other disciplines demonstrate a bias against extended work, within local areas, I think anthropologists must continue to have a go at them — and this may be the only way of opening communication across boundaries between disciplines. Nevertheless, the main contribution of anthropologists is in the analysis of the social elements in production, in distribution of capital assets and material resources, and in organization and reproduction of labour. And, perhaps, they are soon to have a new go at pastoral values and attitudes. I have an awkward feeling that much of what has been said and written about these values has been inferred from the aggregate effects of pastoral behaviour as perceived from outside the system (such as, in the seasonal market supply of livestock, in overgrazing patterns, etc.) rather than from a close scrutiny of models of the economy.

With an increased understanding of pastoral production, it is now time for anthropologists to take a fresh look at the value system as formulated in local terms, the production system acting as a background. What is "hoarding," prestige, generosity, sales, capital, growth, continuity, security, economic folly, investment, solidarity, etc. to a Bedawie, a Turkana, or a Barabaig? How are the symbolic expressions of the economic-ecological reality of pastoralism linked to larger systems of thought?
Each of the pastoral groups with which the participants at this symposium are concerned has a worthy cultural heritage. As anthropologists we should record it or work for economic opportunities for local scholars to document the traditions before they are forgotten. However, anthropologists are frequently accused of being conservationists, eager to keep traditional societies and cultures in their pristine shape as if they were treasures like the art pieces of Venice or Abu Simbel. I think that what should first and foremost motivate our concern with pastoralism is that it appears to have had a rather efficient way of providing people with food for centuries. If so, we need to identify the conditions for its continued functioning or the alternatives for employing the people and range resources concerned.

One should not idealize the past. Many authors refer to harsh regulatory mechanisms that in the past adjusted the ratios of human and animal populations to the pasture resources, mentioning such things as epizootics, starvation, territorial expansion, feuding, the expulsion of unviable units from the system (Haaland 1975), and so on. Most of us believe that a system regularly culled by starvation is not morally acceptable. Nevertheless, it should be recognized that we know very little about the history of pastoralism or how the effects of past regulatory mechanisms compare with those of the present.

The extent to which the regulation is attributed to dramatic disasters or more subtle processes is still a matter of personal speculation. For example, mass starvation of livestock may have decimated the herds, or, equally plausibly, the animal population may have been decimated in stress years mainly through increased slaughter and reduced fertility. Territorial expansion may have taken the form of bloody wars (certainly less devastating than those of today); or it may have been achieved by a more gradual shift in political dominance between one ethnic group and another — the migration and assimilation of individual groups rather than large-scale conquests. We do not know to what extent veterinary sciences in the truly pastoral areas really compensate for the introduction of nonindigenous epizootics like rinderpest during the era of European expansion.

Events in the meteorologic history can sometimes be traced in the vegetation; oral history provides some clues to the occurrence of serious disasters such as drought and epidemics. Still, it is difficult to ascertain the extent of periodic starvation. Drought is not an objective phenomenon depending solely on climatic factors; its effects can be harsh or not, depending on the resources for recuperation and general level of health of the society.

What is apparent is that in vast areas still under pastoral use, livestock has been reared by nomadic pastoralists for at least a couple of millenia without completely eroding the ecological base. Today, there are serious signs that nomadic pastoralism as a system of supplying provisions is breaking down; human impoverishment and land degradation are the most important expressions. It is no coincidence that during the 20th century the effects of the Western economic system permeate even the furthest villages of the world and that pastoral resource extraction appears to have exhausted its possibilities. One must avoid confusing the shortcomings of traditional practices with the symptoms of a changed resource base and must look more fairly into the reasons that this subsistence system is subject to repeated crises today.
the problem of continuity

Some of the salient characteristics of the pastoral production system are general aridity and unpredictability of rainfall. The pastoral system copes not only with wide seasonal changes in climate but also with abnormal years of drought (or excessive rains), which are almost as frequent as those that conform to a seasonal pattern of rainfall.

In the face of climatic unpredictability and the evasiveness of animal wealth, a dominant problem for the pastoralists becomes that of continuity. Much more than farmers, they constantly risk total losses of capital and production assets: much of their efforts must go into securing the regrowth of herds and safeguarding of future production of milk rather than maximizing immediate profits or consumption.

This concern with constant risks of loss can, in many pastoral societies, be shown as institutionalized in the social system. One of the several ritual, political, juridical, and economic functions of descent groups is to provide mutual insurance against disaster: to make redistributions of capital to those who have lost their livestock. The herd owner not only adapts herding arrangements to accommodate risks but also usually engages in relations of livestock exchange (stock friendship) or mutual risk-sharing to create a fund of goodwill or direct claims to stock (Dahl and Hjort 1979). Success in this respect often depends on the initial wealth of the herd owner even if most East African pastoral cultures ostensibly honour people who are generous.

For the individual herd owner, continuity must also be represented in the composition of the household herd; disturbances in herd composition created by drought or war can upset the economy for a long time after the return of rain or peace. When one realizes the importance of continuity both in milk production and in the production and survival of calves, one can also appreciate the need for a better understanding of livestock "demography" not only of the trends in absolute numbers but also of the internal structural changes to which herds are subject (Dahl and Hjort 1976).

The understanding of the demographic processes acting on livestock herds has deepened during the last decade. Building large herds solely by reproduction has been shown to be less possible than earlier assumed; primarily postdrought growth rates, which are abnormally high, have been recognized as unsuitable for herd projections covering a longer time. The differences in growth rates between herds of camels, cattle, and small stock have also been recognized as consequential for the economic organization and value systems prevalent among pastoralists specializing in only one type. Although some progress in model-building of internal herd dynamics has been made, there is still a lot to do in this field, to refine the models — for instance, studies of age-bound fertility, fecundity, and mortality. There is also room for many long-term empirical, demographic studies of animal herds and of how their composition is affected by climatic fluctuations. Badly needed are studies that follow the same herd for several years — studies that have a sound institutional base so that they can be independent from the enthusiasm or boredom felt by specific researchers and from the constraints in research planning inherent in the way individual research tends to be financed.

Even where milk is the staple of the diet, it is not usually available in the same amount all year. Slacks in milk production occur partly because of the
fact that the animals do not calve and lactate evenly over the year, partly because of changes in the quality and quantity of fodder. Low milk production tends to coincide with periods of high-labour demands. This problem is particularly acute in regions with only one rainy season. Similar problems occur also in the two-season belt as soon as one of the rains fails; for instance, a cycle of monoseasonal breeding may result from drought and last for some years (Dahl and Hjort 1979). Of all the livestock species used by African pastoralists, only camels are able to lactate for a full year. However, the lactation pattern of camels is more vulnerable to disturbances than that of cattle, because of the extended periods between camel calvings.

A combination of small and large livestock evens out the milk supply to some extent because of the different and sometimes complementary lactation patterns (Dahl and Hjort 1976). A combination also provides an easy way to supplement the diet with meat during the slack season. Dry-season bleeding and slaughtering of oxen otherwise fulfill this purpose, as does “take-a-chance” farming or the import of grain. Again, the coincidence of the period of pastoral food shortage with the peak of labour demand is one of the most urgent problems to be solved and one that needs focus in development efforts to improve pastoral living conditions.

Strategies for Security

What are the most important ways that herders can limit their risks? Or, what are the main strategies in herding and husbandry practices? I believe they are the mobility of stock, species diversification, herd dispersion, and herd maximization. Of these, mobility of stock is the most conspicuous and has drawn the most attention from outside observers. Its main purposes are to ensure that the animals can take advantage of fresh and protein-rich pasture and get a sufficient mix of necessary minerals, avoid overgrazing resources, and avoid disease-carrying insects.

Geographers and anthropologists have tried to classify pastoral households and societies according to their patterns of movement. Such patterns are regulated mainly by the degree of seasonal predictability of rainfall and pasture that may or may not allow the monopolization of certain migration routes. If the seasonal changes are regular, transhumance is along narrowly fixed routes of migration between dry-season areas and wet-season areas. In contrast, if rainfall varies widely, for example in northern Kenya, a constantly changing pattern of migration develops between dry-season and wet-season poles. Mobile management of livestock often also entails mobility of humans but not always of complete households.

Frequently, there are several different kinds of mobility represented simultaneously, such as in the special case when the herd is divided into a milch and a fallow section (Dahl and Hjort 1976). The milch stock are kept with the household camps and are taken only on short daily trips for pasture and water; the camp is shifted seldomly, perhaps only after a few weeks or even a year. The fallow herd consists of dry stock not needed for household consumption. The animals of this herd are taken on continual searches for the best pasture.

Mobility of livestock is probably the basic condition for a nondestructive pastoralism — a condition that has been undermined in many places by the establishment of game parks and commercial ranches or by the extension of
dry or irrigated farming, involving a loss of vital drought recourses. Mobility is also very labour-demanding and, hence, vulnerable to disturbances in the local access to food, the lack of which may push herders temporarily or permanently from an area. The result is a vicious circle: decreased numbers of personnel leading to declining mobility, which further decreases the numbers, and so on. Mobility is also sensitive to political unrest and security regulations. An important but long-neglected field of study that has drawn the attention of a UNESCO team in northern Kenya is the role of camels for maintaining the mobility of other types of herds.

The signs of declining mobility are exemplified in overgrazing close to permanent water points. Overgrazing is usually interpreted as a symptom of overstocking. I would suggest that labour shortage and the loss of land are reasons that are at least as common as those cited by Pratt and Gwynne (1977) in their recent book on grassland ecology in East Africa. They note that overgrazing may be due to excessive human populations and the need to keep enough animals to survive or that it may be due to an overaccumulation of stock in relation to needs.

Herd diversification is the combination of herds of different species under the same management. It is motivated by the fact that cattle, goats, camels, and sheep fulfill different purposes and have different production profiles of milk, meat, wool, fat, and blood. Herd diversification is advantageous because it allows the household to extend the period when milk is available. It also implies an opportunity to reduce the risk of a total loss, for different species are subject to different disease risks, and it makes possible a more efficient use of the available pasture resources, the animals having different and mostly noncompetitive grazing and browsing habits. In response to drought, small stock have superior recovery rates, and the qualities of quick reproduction and small size make them a useful complement to the less liquid wealth of cattle or camels.

As in stock mobility, the setback in diversification is the labour cost; normally each category of stock requires its own personnel, and this requirement may add to the strain already caused by the fact that even within one species not all animals can be treated the same. For example, dry stock cattle may need their own herder, the milch cows theirs, the big calves theirs, and the newborn or sick beasts theirs. The labour needs are one reason that, although frequently small stock and cattle or camels are together, it is difficult for a household to breed both milch camels and cattle; it is rare even in areas where pastures for both exist. Sometimes camels are kept along with cattle and used for transport but not often are they bred together. Using the animal as a load carrier does not entail as much work as maintaining it for reproduction. Perhaps one should not apply the concept of diversification to such cases but rather reserve it for a combination of two (or more) species that are locally bred and used as food producers.

Herd dispersion, the third approach to risk reduction, refers to the practice of spreading one's animals into several localities to counteract local risks of disease or theft. Frequently, it is rather an aspect of considerations than a practice in its own right; it may take the form of distributing stock loans, dividing the property into two or more herding units, or even splitting whole households between two neighbourhoods.

The fourth strategy of reducing risks, which partly follows from the others, is keeping as many female animals as possible. It is closely related to production yields; as seen in Hjort's paper to this conference the minimal size
of the basic herd needed to maintain a family is in itself rather large. In effect, the basic herd has to be even larger than the minimum so that it has a margin wide enough to provide both immediate food production after a large-scale loss and long-term recuperation of the herds. There is also security in numbers in the sense that the larger the population of livestock, the smaller the probability of a skewed distribution — e.g., of too many bull calves or of all cows' drying up at the same time.

Adaptation to insecurity depends on labour-consuming devices. A large herd can sustain more labour and, hence, make possible specialized care for several categories of stock. It is quite logical from the individual’s point of view to expand both the animal herd and the assets of labour one controls. Prestige, which used to be seen as the driving force behind the wish to expand, is only part of it — and prestige lies as much in the ability to lavish generosity and to have a secure position as manager of a large herding unit of people and stock as in sheer numbers of cattle.

The logics of individual economy and husbandry favour the accumulation of large herds, but there is little known about whether the pastoral households can be said to hoard in the sense of maintaining herds far larger than their subsistence needs. There are few, if any, provinces or districts in the semi-arid zone that can boast accurate figures on human or animal populations, although the idea of a universal population explosion among cattle in arid areas is widely accepted. Trustworthy averages for the animal—human ratio are equally difficult to find, and correct estimates for the distribution of cattle-for-use or property holdings are only available for limited localities. Where it is known that there are more animals than the range can carry, it is certainly not known whether there are more animals than the minimum needed to support the population or whether the available animals are equitably distributed or held by the wealthy few.

Even when herd owners are willing to reveal the number of cattle they own and the property structure of the herd they manage, collecting the information is a tedious and time-consuming task that most researchers abhor. Funds for large-scale censuses or aerial surveys are never sufficient to obtain such refined data. Hence, the relation between so-called hoarding and overstocking is always vague.

labour, property, and pastoral production

The dominant strategies for pastoral insurance, i.e., species diversification and herd mobility, favour large units of labour. Although all tasks connected with pastoralism are not physically as taxing as those connected with cultivation, pastoralism is labour-intensive in that it demands the involvement of many hands, especially if all age, sex, and species categories of stock are to be given special treatment according to their needs and capacity to move. Therefore, planning for development schemes needs to be based on a larger unit than the nuclear family. The need for more consideration of the subject of pastoral labour has been brought up at this conference by Peter Rigby and Stephen Sandford among others. Rigby has underlined the importance of evaluating the relative returns to labour in cultivation and pastoral systems and stresses that one should strive after a labour-based estimation of the value of grain and livestock products. Sandford points out the need for more precise quantitative data on the
relations between herd size and labour demands. But it is also important to
give more attention to the qualitative aspects of labour organization. A
framework for a study both of the internal structure of pastoral society and of
its integration into a wider context can be built on the simple questions of
who carries out what for whom and who is gaining the profits of pastoral
labour in terms of food as well as capital growth.

The African pastoral herd owners usually rely on labour from their
closest relatives and in-laws. The risks of misappropriation of products or of
animal theft mean that the owner-manager exercises a strong degree of
social control on those who carry out the pastoral work. It is easiest to rely on
people with whom one has bonds of reciprocal solidarity or over whom one
wields some form of control, for example by their future inheritance. In fact,
many of the independent pastoral units are aggregates of nuclear families
who are not able to maintain viability as separate entities. Sometimes they
are households of poor clan members or clients. In other cases they are
families of women and children, linked together by common ties to a
particular man who may be the father, husband, brother, or son.

The herd-owning unit can only manage independently as long as a
pastoralist has access to enough labour (sons, sons-in-law, younger brothers,
nephews, or clients). The development cycle of the family is therefore critical.
When a herd owner is able to engage labour from outside the household, the
relation between herd owner and worker frequently takes on a kinship
character or is cemented through marriage.

The number of persons needed to care for a herd does not increase
evenly with herd size. In simple terms, it does not take more persons to look
after 60 cattle than to herd 30. The numbers of people depend on the mix
of stock, age, sex, and species. Ideally, even small herds are mixed;
consequently wealthy households with access to labour not only can achieve
a refined division of work for itself but also has a theoretical margin where
they can add animals to their herding unit at a low labour cost. Poorer people
not able to maintain a whole set of herders ally themselves with rich herd
owners, adding their animals to the larger herds and ensuring suitable care.
In effect, this is a way whereby the leader of a large herding unit can get
access to cheap herding labour. In normal times, unviable pastoral
households can remain in the pastoral community through this system as
submerged herding units either in perpetuity or until they have recovered.

The distribution of animal wealth over the population is not static but
changes constantly with stochastic luck in breeding a good proportion of
female calves, with managerial skills, with the social demands for stock, and
with the vicissitudes of theft and disease.

The property concept itself may allow for flexibility in the organization of
labour and allocation of authority over stock. Property relations are a field
where pastoral culture often contrasts sharply with Western culture, which is
implicit in the professional culture of African planners and administrators.
This adds to the difficulties in registering wealth. Ownership of stock is often
not clear-cut. The local culture may, for example, in theory or practice
differentiate between the rights to sell and dispose of stock; the rights to milk
cattle and slaughter their offspring; and the rights to make decisions over the
care and herding of stock. Particularly between grandparents, parents, and
children, rights may be fractionated so that the son’s property is counted as
part of his father’s property, which in turn is part of the grandfather’s
property. Each of them may equally refer to the animals as his. Similarly,
“my herd” may refer to the herd under one’s management or to animals owned but placed with friends and relatives.

Such references are a question more of difficulties of translation and communication than of confusion of concepts on the part of the pastoralists. However, in combination with traditional systems of paternalistic protection, a fractionated property system implies a certain flexibility for shuffling around both livestock and labour between different herding units. The wealthy in this system combine a substantial number of animals to which they have full disposition rights with the unviable property units of a large number of dependants. Relying on the work carried out by dependants, they acquire labour cheaply from the point of view of monetary expenses but have obligations of a wider scope and more diffuse than those of the employer to employee.

Such flexibility in the composition of households and herding units may have worked as a source of social security in times when losses were not made on a community-wide scale and an absolute shortage of food was not at hand. Today’s disturbances as a consequence of drought in combination with a shrinking resource base, however, are of such scope that a large number of unviable units can no longer be absorbed. Labour migration, the present solution, does not work as a restoring mechanism but acts selectively on the categories of labour most desperately needed to maintain the system and secure it against further disasters. At the same time, the integration of pastoral production and society into a national economy and administrative system tends to freeze the prevalent structures of inequality in control over capital and monopolize the means of protection against disaster in the hands of a pastoral elite. This elite is closely associated with the local bureaucracy and merchant class. In that context, the traditional labour relations may acquire a more feudal character, where the labour from a rich herd owner’s closest family members is diverted to other, nonpastoral tasks and substituted for by the work of more distant kin. A dual split of pastoral society may occur such that on one hand are town-based leaders who control the distribution, use, and care of livestock and on the other hand the people of the camps who are struggling to maintain or achieve a minimal level of household viability but largely referred to the protection of wealthy, more-or-less absent patrons. To monitor the trends and their effects on the pattern of land use and production should be anthropologists’ most important task as social scientists and “pastorologists” during the 1980s.

discussion

Willby: I am surprised that there was no mention of the effect of massive population increase on livestock production. The basic resource is the land and the forage it produces. As the rangeland decreases (through parks, cultivations, etc.), nutritional intake may drop below optimal or customary levels. Although a society’s herd may grow in numbers, total output remains static or even lower, mainly as a result of poor reproduction stemming from poor nutrition. In many pastoral contexts, this overpopulation is the major factor affecting livestock production, hence the emphasis in most range-development projects on increasing range capacity by various technical interventions.
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Dahl: I agree that we must see land as the basic resource for pastoralism; loss of land is the ultimate threat to pastoral viability and should perhaps be our main concern here at this conference. However, in my paper, I draw attention to the risk of overgeneralization when it comes to assumptions of a livestock population explosion. The question posed by Willby seems to imply that livestock population growth follows logically from human population growth, which is of course questionable. Pastoral land-use patterns are the result of a complexity of factors, and we must take care not to form too-hasty conclusions. If there is at all such a thing as overgrazing — which Meadows, for example, asks us to doubt — a high overstocking rate is certainly likely to lead to widespread degradation of pastures. Understocking, on the other hand, is likely to result in similar, but localized, patterns of overuse in important areas near permanent water. The reason for this is that people are required to assure mobility, and people need food. When mobility is reduced by labour shortage, this may have detrimental effects on vegetation and on animal health and nutrition, even though the general density of animals is low.

Khogali: The situation in the Red Sea hills region is different from that in many other nomadic areas. Because of an increase of animals at one time (also because of fluctuations of rainfall), the vegetative cover deteriorated. Because of the hilly nature of the region, widescale soil erosion occurred. The region has not, since the 1940s, recovered its vegetative cover; the number of animals could not be increased and in fact may have continued to decrease.

Aronson: This has been an exchange typical of those between anthropologists and development agents. The issue of population growth, or population:resource ratios, is a sacred cow for each side. If the ratio is not declining, much of the justification for development projects is lost. If it is, anthropologists can’t hope much longer that pastoralists will muddle through. If we only agreed that this profound but contradictory pair of assumptions must be rigorously tested, we would have accomplished something at this conference.

van Drunken: If nomads themselves are turning more and more to alternative means of subsistence, involving education, migrant labour, and farming, is this not an indication that they themselves understand that herd maximization is outdated? And if people say there are fewer animals than before, perhaps they mean per family, rather than in total? The Merrymans (who have worked among Somali) found that, through outside activities, nomads manage to replenish their herds at an accelerated rate after disastrous periods like war and drought; the average herd per family had increased, whereas at the same time there was a movement from the nomadic sector.
livestock as food and money

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Although this conference is devoted to the future of pastoral peoples over an area far greater than East Africa, I should make it plain at the outset that my remarks pertain specifically to East Africa. However, I feel sure that by implication they have relevance for at least some other pastoral areas. I want also to note that what I have to say is for the most part not new but a summation of what I have said in the recent past in other publications (Schneider 1974, 1979). My reason for replowing old ground is simply to make sure that all persons here know of the position I have taken on the matter of the explanation of East African pastoralism and can therefore discuss it on an equal basis.

peculiarities of indigenous pastoralism

It has long been recognized that livestock in East Africa, particularly the large animals — cattle and camels — are utilized in ways that conflict with sound management practices as they apply to beef production. As long ago as 1926, Herskovits tried to delineate this difference in terms of the notion of the cattle complex, and although today most people who are involved with these animals have rejected the idea that there is some mystique about their use, there is still puzzlement about how to explain pastoral practices. A good index is a paper by Ward et al. (1980) on animals as an energy source in Third World agriculture, in which they note that the annual offtake for cattle herds in Africa (by which they seem to mean all of sub-Saharan Africa except South Africa) averages only about 3% compared with 35 or 40% in North America. These North American rates are achieved through highly rationalized beef production practices, in which, most importantly, calves are brought up to feeder weight rapidly — within a year — and then are sold to feed lots for final fattening.

The situation in Kenya, if Aldington and Wilson's (1968) figures are still acceptable, is somewhat more complicated than Ward et al. indicate. There seems to be a bimodal distribution of local groups in terms of offtake, the higher group, with rates ranging from 16.9 to 24.4% yearly for the Kamba, Embu, Thika, Meru, and Taita, who are more “developed” than the more remote group including people around Lake Baringo, the Turkana, Kajiado Maasai, Narok Maasai, Samburu, Nandi, Elgeyo-Marakwet, and Pokot, whose offtake ranges from 7 to 13.2% per year. I suspect that at present the questions how to increase the offtake and what causes it to be so low are more relevant to the latter group.
Currently, the favourite explanation for the low offtake is subsistence. A recent volume by Ingold (1980), which compares reindeer herders with East African pastoralists, presents this view in an exaggerated form, almost a caricature, by classifying reindeer herders as carnivorous pastoralists and East Africans as milch pastoralists who keep herds principally for the purpose of producing milk for food. A more generalized form is Konczacki's (1978) claim, applied especially to Somalis, that the maintenance of the largest herds possible is insurance against disasters such as drought. Widstrand's (1975) views, most particularly as they apply to the Pokot, are well known in East Africa and are parallel to those of Konczacki in claiming that nomads keep large herds for insurance against hard times.

That East African livestock raisers use their herds for subsistence is not in question. Although the Turu of Singida in Tanzania, among whom I worked 20 years ago, accord little importance to milk, its value as a food seems to rise proportionally with the rise in the ratio of cattle or their equivalents to people because this ratio correlates with a decline in attention to agriculture (or the possibility of agriculture). Milk increases in importance not just because it is one in relative abundance but because utilizing it obviates the need to trade so many animals for grain and other agricultural products. Similarly, every person who has ever worked with pastoralists in East Africa, from as far back as Evans-Pritchard's (1940) study of the Nuer, knows that almost every animal ends in the "pot" and is eaten, unless some special circumstance prevents this.

Those who have lived intimately with such people also know that to exist solely on milk is difficult or impossible — a fact made plain by the admirable study by Dahl and Hjort (1976). Their simulations of zebu herds showed that a family of six would theoretically require a total herd of 60 animals (a large proportion of milk cows and a support structure of calves and bulls). In the dry season, the herd numbers would need to be nearly 600 to produce enough milk to feed the family. By my calculations (Schneider 1979), only the Maasai, Samburu, and Barabaig of Tanzania and the Somalis could accomplish the required ratio (10 cattle/person) in the wet season, and probably none could reach the 600 : 1 ratio needed in the dry season. When I lived with the Pokot many years ago, the young men of humble means living along the mountains at Ortum used to speak of how they hoped some day to be real pastoralists living in the plains of Masol and Riwa subsisting only on milk, but they were idealizing a situation that at other times they admitted did not and could not exist because, during the dry season, cows give so little milk.

Similarly with beef, Adlington and Wilson's (1968) study of the marketing of beef in Kenya showed graphically that the size of East African herds is not large enough to produce enough beef to maintain the population even if supplemented by milk. The 39 groups they studied consumed only about 10 kg of meat per person per year, judged by the sale of hides. Even the Turkana consumed only about 5 kg per person per year despite having herds averaging more than 10 head/person — a ratio that is high for East Africa. This consumption compares with per-person beef consumption (1976) of 60 kg (Ward et al. 1977) in the USA. The Turu in 1960 had about 225 000 cattle for a population of about 175 000 people. Based on the
maximum offtake rate that is possible for East African herds managed in traditional ways, 13%, one can calculate an annual supply of animals for slaughter, 29,250. The average weight of the zebu is about 230 kg, and the hanging weight, that is, annual consumable meat and bones, is about 50% of that or about 3324 Mkg. This gives an average of 20 kg per person per year. I realize that these calculations leave a good deal to be desired: for example they take no note of mortality, which would reduce the amount of meat available, but based on Aldington and Wilson’s (1968) conclusions, I suspect that they come close to the actual case. Theoretically, the Turkana should have available a minimum of five times the amount of meat available to the Turu; yet they are shown as consuming only about 5 kg per year. As Aldington and Wilson (1968) used the hides sold to estimate beef consumption and because some of these people destroy the hides while slaughtering the cattle, they could have enormously underestimated actual slaughter. On the other hand, anyone who has worked with people like the Turkana or Pokot knows they do not eat large amounts of beef. Any American teenager would make them look like vegetarians.

In other words, all East African pastoralists must depend on foods other than milk and meat to sustain themselves, the rich to a relatively small degree and the poor (cattle : person ratios up to 5 : 1) a good deal. The Turu, with fewer than two cattle per person in 1960 depended for all practical purposes on bulrush millet as the staple, and the majority of Pokot I knew depended on finger millet. The wealthier Pokot used to buy grain from the agricultural Pokot, as did the Turkana. Deshler (1975) estimated that only 25% of the Dodos’ diet came from animal products, and according to N. Dyson-Hudson (1974) the figure is only about 35% among Karamojong.

monetary explanations

Although the subsistence explanation for low offtake is probably still the most popular, there is increasing recognition that there is another, formerly underestimated reason: the use of livestock as repositories of value. Randall Baker (1980) is probably the most recent person to assert the importance of this fact:

In addition cattle are often a significant medium of exchange both for other foodstuffs and in building and maintaining a web of social bonds and obligations connected ultimately with security. It is this second function which has so often led to confusion over pastoralist behaviour and given rise to much of the mythology regarding "sentimentality" and irrationality.

Such views are not confined to East Africa. Horowitz (1975: 338–389) has emphasized the importance of exchange among pastoralists in Niger:

We are trying to understand... the processes of pastoralism, by centring on transactions, those interactions in which there is an exchange of value or, as Barth puts it, "... those sequences of interaction which are systematically governed by reciprocity." It is empirically verifiable that, where values are exchanged, each actor tries over the long run to see that the values received in exchanges are at least not less than the values given. ...
Others who in recent years have stressed the financial function of livestock include Lewis (1976), Goldschmidt (1972), Sarbo (1977), and Haaland (1977).

The implications of livestock’s acting as a repository of value are worth exploring from the viewpoint of monetary theory. Einzig (1966) points out that money has two dimensions, its commodity value and its monetary value — features that to some degree move independently. When Radford (1945) analyzed the use of cigarettes as money in prisoner-of-war camps in Germany during the Second World War, he noted that when the supply of cigarettes from the Red Cross was interfered with, the supply of money declined precipitously because men continued to smoke cigarettes. The result was that trade was severely impaired. To some prisoners the joy of a smoke exceeded the value-holding function of cigarettes. To one degree or another, the same is surely true of cattle and other livestock in East Africa, where the subsistence uses of cattle compete with their value-holding function. In fact, disastrous declines in numbers due to devastating droughts might be expected to have consequences for trade parallel to the prisoner-of-war camp.

In considering the role of livestock as money, it is useful to recognize that the line between what constitutes money and nonmoney is thin or even relative. Almost any good has monetary qualities if one defines money, as Einzig (1966) does, as a good that acts as a medium of exchange, store of value, and unit of account (only the three most relevant characteristics). Even a banana acts as money relative to other goods when used as exchange for a mango or a papaw where mangos are always exchangeable for bananas but not for each other.

In such a circumstance, shrewd persons will try to convert their mangos and papaws into bananas whenever possible. In other words, the good that emerges as money in most people’s eyes is the one for which there is the widest demand. Because of demand, the value of all goods is stored in one good. People want to get as much of such a good as they can and to invest it, loaning it to others for a price. Sundstrom (1975) records that in precolonial East Africa at one time or another money was in the form of cloth, copper, brass, pewter, guns and ammunition, iron, salt, cowrie shells, beads, slaves, horses, and cattle. This list contains only the most obvious things; for example, it does not include goats and sheep, which also acted as money.

Because of the relative inelasticity of demand, one good tends to become the medium through which all other goods are traded. Gray (1965) perceived this fact among the Sonjo where, he says, almost all goods and valued rights were exchanged through the medium of goats, even rights to irrigated lands. In other East African pastoral societies, cattle, sheep, and goats, combined into a monetary system, are the medium of exchange. Furthermore, the good tends to become a unit of account, by means of which comparisons of value and calculations are made. When Turu consider problems of inheritance, they calculate the value of the inheritance in terms of cattle and decide how it will be proportioned in those terms, even though the inheritance is goats or sheep. The values for farmland and grazing land are calculated similarly so that the manager can make economic decisions about the manipulation of these goods.

Einzig (1966) also points out that not all monies can act as means of deferred payment (delayed exchange), because they do not hold their value well. The American dollar today is endangered as a means of deferred
payment because of inflation, leading many people to turn to a more secure medium such as gold. Cattle in East Africa have been a very secure means of deferred payment, allowing people to make transactions that extend over long periods.

It does not matter why people value livestock as much as they do. There is a terrible temptation whenever a good acts as a food commodity to think its value in every respect is based on that fact. Grain to a farmer who intends to sell it is not food but a valued good akin to money. Salt money may circulate for a long time without being eaten, to the point where it no longer has any value as food. Westerners surely understand that the value of gold has little if anything to do with its usefulness in filling teeth or making electronic parts.

Livestock have served as financial items in many places in the world including the West in earlier times. Ingold (1980:229) points out that the Latin word pecus, the word for money, also meant a herd of domestic livestock, and the Greek word texos, meaning interest on a loan, also referred to the progeny of domestic animals. He recalls that Marx noted the word capital originally meant cattle. The English language is shot through with words with this double connotation, including pecuniary and chattel.

**money supply and politics**

Although livestock fulfill Einzig's criteria for money, the most important feature of money is its supply because this relates to politics. Although Ian Livingstone (1977) fails to take this relationship into account, his Institute for Development Studies paper exploring the rationale of pastoralists is a major attempt to apply economic theory to indigenous pastoral operations.

Livingstone (1977) asks the question whether it is economically rational for pastoralists like Pokot to want to expand their individual herds. Whereas he finds all their practices, including the use of cattle for bride-price, dispersion of animals for risk aversion, or holding animals for the purpose of gaining prestige, rational he does not find it rational to expand infinitely the size of herds. He asserts that my equation of the process of deflation with reduction in the size of herds is a misuse of economic concepts. His reasoning is that deflation in industrial economies leads to a failure of confidence among business managers, whereas among pastoralists it means a rise in the value of cattle relative to other goods. In this statement, Livingstone (1977) assumes something that is not made altogether clear in his account. Although he recognizes that cattle act as money he appears to believe that the monetary system is not comparable with that of industrial economies because there is no system of investment. I am puzzled because elsewhere he seems to realize that there is a system of investment built upon the loan of cattle to other people. In short, then, decrease in the cattle supply should have a demoralizing effect on the pastoralists too by closing off opportunities to invest.

Einzig's (1966) cross-cultural study of money focused nearly entirely on agriculturally oriented people or people among whom money was a good that could be monopolized. He therefore concluded that the money supply in "primitive" communities is inevitably short and that the "monetary policy" of chiefs in such societies would be to encourage the increase in supply because a low or declining money supply leads to a decline in opportunities for the poor to make money and accumulate wealth, which in turn leads to
discontent. My own feeling is that Einzig is off the mark. I think the money supply is probably low or always in danger of declining in such societies because the nature of the money is such that it is difficult and costly to increase the supply. For a good to serve as money, its creation must be balanced with its destruction, as, for example, in the Lele where raffia cloth is money. But when the supply remains rather static, people are forced into patron-client relationships as the only path to security and affluence. Chiefs understand such things and would not encourage a growth in the money supply to the point where it would endanger their power. In short, societies in which authority of a kingly or chiefly nature emerges are those in which economic growth is little and money supply static. This was probably true of all the state areas of precolonial Africa as it was in feudal Europe. Keynes (1930) shows that the basis for the decline in feudalism in Europe was the huge influx of new wealth from the Spanish possessions in the New World.

Increasingly, economic anthropologists are becoming aware of the relationship between economic opportunity and the supply of money as a key to political equality. Awareness of this relationship is apparent in Melanesia (Strathern 1978; Sahlins 1962) and among the Northwest Coast Indians of North America (Belshaw 1965), and it is certainly apparent in East Africa among the pastoral people. It is this relationship that leads me to urge students of East Africa to abandon their preoccupation with subsistence explanations of nomadism. The more distinctive and analytically useful fact about East African pastoralists is their historical lack of political centralization based on growth economies in which the ratio of cattle (or their equivalents) to people is 1:1 or more (Schneider 1979). The pastoralists do not have to be nomads; it is the similarity between the sedentary ones and the nomads in every important respect that undermines subsistence explanations giving support to the explanation I am developing here. Maasai in their old home in the Rift Valley did not keep cattle because they had no alternative. They were living on prime agricultural land, as are the Nandi, Kipsigis, Teso, and many Pokot.

**money supply and opportunity**

According to monetary theory, a rise in the growth of money supply, which in many economies is based on the extension of credit, encourages production. Because the opportunity to produce wealth (pigs in Melanesia or blankets in the Northwest Coast) is widely available through credit and because the increasing money supply makes credit available, some people continually get rich whereas others fail. Big people abound but there are no chiefs, those whose fortunes continue from generation to generation. In East Africa, the growth in money supply is due to the natural increase in herds — a process that is not stifled by cyclic droughts and plagues that parallel Western stock-market declines, wiping out large amounts of accumulated wealth and redistributing the remainder, because of the confidence of herders in the recovery of their herds. Dahl and Hjort’s (1976) simulations show that the number of female animals in a herd could, theoretically, double in 6.5 years. Massel (1963), using data I gathered among the Turu, showed an annual return over 15%. How this translates into widespread opportunity is not as apparent as in Melanesia or the Northwest Coast where lending institutions and interest are more easily observable and familiar. The basic mechanism in
East Africa appears to be what Gulliver (1955) called stock associateship. I will illustrate this from the Turu.

A Munyaturu who is (or was in 1959 when I lived with the Turu) lucky enough to have many cattle that are increasing steadily soon comes up against a constraint — only 30 head can be kept in one homestead corral; the cost of caring for them increases enormously at the margin because of decline in available grazing, the need for more labour and materials to build a larger homestead, and the like. So this Munyaturu loans some of the animals to another person, setting up a relationship called uriha; loans are made for many reasons — for instance, to take advantage of the skills of a person with a reputation as a good husband or to form an alliance with someone deemed dependable, etc. Because the reasons are diverse, the results at times appear irrational, for example, when a wealthy herd owner loans cattle to others while taking in animals of others who desire alliances.

As a result of uriha, a Turu who has no cattle can always get some because the cattle population is high. There are no households without cattle even though many Turu own no animals of their own. Through uriha, even the destitute Turu who has no legal right to any animals can obtain milk and manure and, over time, acquire such rights and begin the process of building a herd. Marriage is a form of uriha, but in this case the bride's family acquires firm rights to the progeny of the cows and de facto rights to many or all of the bride-price cows.

Marriage and uriha create enormously complex cross-cutting ties in Turu society, so many that they led in 1958 to the demise of the destocking program being implemented by the colonial government of Tanganyika. The government was determined to reduce the numbers of cattle grazing in Unyaturu by 10%, which it tried to do by issuing destocking chits to individual households, ignoring the real ownership of the animals they contained. The government was aware of uriha but felt that because the Turu would not cooperate in identifying loaned animals, a heavy-handed approach was necessary. The result was a 3% rise in the offtake for export — till that time the Turu had voluntarily sold 7% of their stock to obtain money for taxes and a few cheap consumer items — but the rise from about 16 000 head to about 22 500 had immediate and devastating impact, partially because the obligations of uriha had been ignored. The reaction of homestead heads was to send animals back to their owners before the chits were issued on the grounds that they did not want to be responsible for the loss of any animals that did not belong to them. When the Turu tried to explain to government officers why they detested destocking so much, they told them that it was destroying uriha (and, it may be deduced, even marriage). I suspect, they also felt that the 3% increase in destocking interfered with the management of their herds for growth. Turu in fact saw destocking as a political attack upon opportunity, and they reacted violently, causing the government to abandon destocking within a year.

Institutions like uriha, tailored to local circumstances, exist all over East Africa. For instance, the Pokot call it tilia and also compare it with marriage. However, tilia is somewhat different from uriha. Basically, it involves the exchange of a steer for a cow, the cow's original owner retaining rights for half the progeny. People of power and importance in these societies have many stock associates; in fact, whatever may be the optimum arrangement of a herd for the production of milk and meat, this will largely be subjugated to the need for stock associateship. A Turu will not forego the opportunity to set
up a good marriage or establish a strong stock association simply because depletion of the herd will interfere with the optimum milk supply, even though the sale of one cow could purchase an amount of grain, 400 kg, equal to the total produce of one monogamous household in a year, sufficient to feed the family for that period.

In sum, pastoralism in East Africa is not a peculiar subsistence system but a political economy based on a type of wealth that expands naturally, leading to widespread access to wealth and the growth of complex cross-cutting financial ties.

shift to beef production

A shift to beef production is not just an alteration in the pastoral way of life but a radical revolution, a shift to agriculture and a shift to a new political order based on hierarchies.

In the first place, livestock can no longer be treated as money. Beef production, when optimized as it is in the United States, requires large animals — even large calves, which are likely to grow better and produce more meat than small ones (Trenkle and Willham 1977). Such animals, in turn, require more and better quality fodder. Ideally grain is used to fatten them (Ward et al. 1977; Trenkle and Willham 1977), and the optimum beef-raising practices in the United States divide the cattle-production system into two parts, the breeders and the feeders. The former only keep the animals until they reach feeder weight (about 230 kg) when they are shipped to the feeders for final fattening. The process is optimized if males and females are kept apart (Maugh 1978) so that sexual agitation is reduced — a fact that any beef cattle raiser seems to sense instinctively.

All of this is contrary to rational, indigenous, East African cattle production. A form of Gresham's Law is operating in which "inferior" money drives out "superior." The East African values the cow as a unit, just as Westerners value a dollar as a unit and ignore whether it is wrinkled or torn. The result is that small cows drive out large cows, the way that inferior cigarettes in Radford’s prisoner-of-war camp drove out higher quality cigarettes. Aldington and Wilson (1968) indicate that the typical East African zebu is about half the size of American beef animals, producing, therefore, about half the hanging weight in meat. Furthermore, cattle used as money will not be sold when they reach optimal feeder weight but will be kept to full maturity and until they can be used to effect an optimal exchange for grain, a wife, or political gain. The major portion of the herd will be kept in adult female animals, whereas in beef herds the largest number would be young animals and bulls. Caring for young animals and feeding them grain add to the costs and correspondingly decrease the herd's ability to act as a repository of value.

The long and the short of it are that East African pastoralists wishing to turn to beef production while still maintaining the hope of becoming wealthy would have to stop thinking of animals as repositories of value and think of them only as so much hamburger on the hoof. Then, they would have to begin putting their faith in banks, depositing the proceeds of cattle sales to earn interest, or investing the proceeds in other enterprises. The question is: Will their new investment return annually an amount equal to the return they earn by treating cattle as money? Nowadays, with inflation rampant in the
U.S., some people obtain interest exceeding 20%, but this return is based on a dangerously large growth in the supply of money that if not greatly reduced will destroy the economy. In times of stability, beef raisers are not likely to get more than a few percent return on bank savings; if they invested in stocks or bonds the rate probably would not exceed 6%, if that. These calculations assume a profit, which is not guaranteed. The production of protein is very expensive, giving back about one-tenth of the food inputs used to produce it. This fact means that beef is always competing with cheaper foods and is likely to lose a good part of the time.

Even a beef raiser who earns 6% on cash investments may be earning a monetary unit that has little strength as a means of deferred payment. One should not underestimate the shrewd pastoralist's ability to take such things into account. After all, in the U.S. today, it is not just sophisticated bankers who are buying gold and silver but all kinds of people, many of whom are taking old sterling silver, packing it in bags, and hiding it.

I paraphrase Allen Hoben (1979), recently senior anthropologist with the Agency of International Development (AID) in Washington, summarizing a critical examination of livestock projects in Africa, who said that pastoral livestock development is a political, not just a technical, process in which pastoralists are constituents without a leader. They are being asked to abandon a way of life that gives them opportunity to obtain wealth and political equality, for one in which a few will have the opportunity for wealth and the rest will be squeezed out, all in the name of providing sufficient beef at low enough prices to satisfy urban populations. Hoben's conclusions, it should be noted, are paralleled by those in a recent report (1980) on a Conference on African Pastoral Projects done for AID by the Institute for Development Anthropology.

Evidence to support my conclusions is often thin or lacking but no more so than is the case for the subsistence explanation and others. I may have overstated my case but, if what I say about pastoral finance is true, it is important for development policy. The case, I feel sure, is strong enough to demand further investigation.

The recent workshop on pastoral development projects in Africa strongly recommended studies to obtain better quantification of pastoral operations because so many questions cannot be answered. Those who have worked with pastoralists in East Africa will be quick to point out that the pastoralists refuse to reveal information about the numbers in their herds. The Pokot had a special counting system reserved for cattle, which was used whenever there were public discussions of specific herds, consisting, as I remember, of only eight numbers: 10, 20, 30, 40–50, 60, 70–80, 90, and 100. But there is a danger of exaggerating this. When I worked with the Turu, I found the reverse, an almost embarrassing tendency to tell me everything. I suspect that the failure is often on the part of field workers who are not persuaded of the value of the information. Anthropology, in particular, has historically tended to emphasize the structure of social relations, embodied in such things as kinship terminologies, and has failed to pay much attention to the quantities involved in production. Perhaps this tendency stems from the fact that anthropologists are poorly trained in economics and have not made

future research
the fascinating discovery, fundamental to economic thinking, that most functions are curvilinear, that is, the relationship, for example, between cost in producing cattle and the amount produced alters at the margin and is not constant.

No doubt it will be remarked that there are plenty of people now working on pastoral problems who do know how to count, particularly agricultural economists, but I think the social anthropologist or sociologist has a special role to play in this process by working on quantification from the inside. The agricultural economist does not ordinarily work closely with the people for a long time as the anthropologist does. What is necessary then is to train social anthropologists to ask new questions that encourage informants to talk quantitatively about such things as their management practices and even their philosophies of management. Pokot or Turkana might be reluctant to talk about how many cattle they have, but they would be less reluctant to discuss whether they are managing their herds for maximum milk production. They might even explain how they manipulate cattle for power and influence.

To test hypotheses about pastoralism, one needs better information on indigenous trade of livestock for other goods, particularly grain. One needs figures on ratios of livestock to people, rate of growth of herds, and rates of rise and fall of wealth. One also needs figures on the velocity of movement of livestock through the population as well as better information on cross-cutting links based on stock associateship. These are but samples, all derived from my claim that the key to understanding pastoralism in East Africa is to consider that it functions as a monetary system.

In addition to the general need for quantification of elements relevant to pastoral operations, most particularly their subsistence and financial uses, a special project, suggested by the bimodal distribution of offtake rates, should be to study groups of Africans, perhaps at places like Machakos (Livingstone 1976) or Kajiado (Hedlund 1971), where the quantum shift from pastoralism to ranching has been successful. By learning how Africans have succeeded in shifting from the use of cattle as money to cattle as beef and milk producers, one should be better able to understand how cattle work as money and to design policies that can encourage a shift to beef and milk production just as understanding how the monetary system works enables Western governments to devise policies to impede or promote inflation.

**discussion**

White: Historically, low volumes of commercial cattle sales from pastoral areas in Kenya were a response to low levels of demand from the rest of Kenya. Lack of alternative investment opportunities for pastoralists led to surplus wealth being held in the form of cattle. The store-of-value component is valid when these conditions hold. This position has changed over the last 10–20 years in Kenya. Pastoralists have shown themselves willing to sell those cattle surplus to their subsistence requirements when market opportunities exist. A recent Ministry of Livestock Development study, which we organized, attempted to calculate the potential supply of immatures (young bulls) from northern rangelands of Kenya and compare it with actual sales. In each district of northern rangelands, cattle were classified into selected age and sex categories. The potential supply of immatures was
defined as that proportion of bulls in the herd 1 year or older that could be sold annually. This supply of immatures is only around 5% of the herd in any 1 year.

We counted around 350,000 cattle and classified them into six groups: bull calves, cow calves, cows, heifers, working bulls, and all other bulls over 1 year. Range management field staff achieved a high coverage of cattle — 108,000 in Mandera, Wajir, and North Garissa (about 30% of cattle population), 25,000 in Isiolo (about 15%), and total coverage in Samburu (221,000). They gave almost exactly similar herd structures, when differences in preferred age of sale were taken into account. Cattle are sold as young as 18 months in Wajir and Mandera, rising to around 2 1/2 years in North Garissa and Isiolo, and 3–4 years in South Garissa and Samburu. No data exist yet for Marsabit. These consistent results are independent of dependence of populations on camels, goats, etc. Two important conclusions resulted from the exercise: First, the annual levels of sales of immatures are now close to estimated potential, which 20 years ago was not the case, primarily due to lack of demand by the Kenya Meat Commission; second, bull-calf mortality seems to be running at 35–40% compared with cow-calf mortality of about 10% in each district.

Similarly, in the southern range areas of Kenya, current sales levels of slaughter stock (bulls 3–4 years and culled cows) are close to available or potential supply. In both northern and southern rangelands, cattle are being sold when they are in good condition and at commercially desirable ages; there now seem to be few old, unproductive cattle in the herds.

Our tentative conclusion is that the pastoral herd structure is one that enables the herd to recover quickly after a drought.

Pastoralists in the south are using their surplus wealth to invest in productive livestock, both upgrading stock and, in Kajiado, buying immatures and fattening them for profit and for social investments such as school fees, school building programs, motor cars, etc. In Kajiado there is a higher per-person level of purchased foodstuffs (we have not investigated what northern pastoralists are doing with any surplus wealth).

Finally, we conclude that sales from pastoral areas can only increase if cattle herd structures change.

If herd structures determine the sale of cattle, what determines the herd structures? There are three possibilities:

- Milk is still in short supply, and bull calves are allowed to die. Maasai deny actually killing such cattle, but their herd structures are the same: bull calves disappear at 5 months of age, but we don’t know why or how.
- Drought recovery is possible if a high proportion of calves is retained, so dynamics of the herd itself may result in a certain structure.
- There may be a labour factor, for the amount of labour available for caring for all immatures may be insufficient. Only 4–5% of the herd can be sold each year; to increase that amount to 7–10% means selling fertile cows.

We dispute Schneider’s statement that pastoralists ignore the difference between high- and low-quality cattle. We disagree that it is difficult to collect good data on pastoral herd structures. Pastoralists will answer questions about herd structure, if they understand the motives of the questioner. We agree that low rates of offtake cannot be explained by subsistence needs, but
we think basically that the store-of-value argument is now out of date. The major factors influencing cattle sales and offtake rates are herd structure, market demand, and rates of return.

**Schneider:** Although the settlers and government of Kenya did impede the flow of indigenous cattle to market through such devices as quarantines, no one who worked among Pokot 30 years ago or Turu 20 years ago can believe that the cattle were held off the market like cows are now. Tanganyika pastoralists actively sought to buy cattle in Singida and had regular markets, and in Kenya Pokot actively sought animals. But during the war the government had to, in effect, confiscate animals, and the Turu, as I have said, would not voluntarily sell more than 7% a year. It might be true that they refused to sell because prices were too low. I insist that the view that animals were not sold because there were no markets misunderstands fundamentally the internal use of animals in finance and investment.

If willingness to sell cattle has changed in the last 10–20 years, I would like to see the statistics. They would be valuable for research and commercialization of livestock raising and would also be an index to profound social change.

White’s data are interesting and valuable. But their meaning is not obvious; the data require reflection and further analysis. Therefore, I shall not comment further on them. There is, however, one thing that should be said about Kajiado. If the figures mentioned are from Kaputei Hedlund (1971) reported that some Maasai there have indulged in highly commercialized operations since the 1960s.

With regard to the specific comments on my paper by White: first, whether a person believes a cow is a cow is a cow is beside the point. East Africans use the animals in monetary and accounting transactions. They can and do treat cows as a commodity and do not equate them. Second, I don’t recall that I said that herd structures can’t be discovered. I never had any trouble getting such information; however, it is usually difficult to get herders to say how many animals they own. But, such figures can be obtained if one is persistent. Third, I am sorry to hear that people, whose positions in the Ministry of Agriculture make their impact on pastoralists great, flatly disown the idea that livestock are stores of value. Their opinion is surely wrong and will have unfortunate consequences. It is important to demonstrate the truth unequivocally, perhaps through wider dissemination of the statistical evidence.

**Marx:** Schneider’s main point, that animals also serve as “repositories of value,” is well known and considered self-evident in Middle Eastern anthropological literature. There, the pastoralists themselves view animals not only as bearers of value but as capital that creates interest. In view of the fact that the major products are sheep and goats, whose reproduction rate is high, this attitude may be valid. The main distinction between East Africa and the Middle East is of course that in the latter region pastoral production has, since time immemorial, been directed at a profitable market. In East Africa, only in recent years have markets developed. The pastoralists, are adapting easily to the new conditions, and the anthropologists are slower. Still, younger anthropologists, including Schneider, are now dealing with market conditions and treat animals also as capital.

**Rigby:** There is a contradiction in Schneider’s paper. He presents the view of pastoralists as “pursuing profit across the plains.” We should not universalize
this view of the maximizers and thus impose bourgeois economic notions onto groups for whom they are alien. If we do so, we shall miss the impact of capitalist economics on pastoralists. Herds in pastoral societies are not just capital but represent the means of production.

Schneider: Rigby has misunderstood the thesis. Stock association — the apparently nonrational ties through livestock — is the epitome of the thesis, for it represents investment in social ties. One cannot assume that the pastoralist is a capitalist; it is an outcome of analysis. At present, we have a real need for information, such as the valuable new data that White has described.

Conant: So far, your paper and Judy White’s figures all refer to cattle. Would your conclusions about pastoralists’ perceptions of their herds as money or White’s figures on offtake and herd composition be changed in any way if goats and sheep were included, along with cattle?

Schneider: There are two aspects to the answer. Aldington and Wilson’s study shows that adding goats and sheep to the meat supply in East Africa adds little to the total amount. So I don’t feel driven to take them into account in a general discussion. However, it would be good if we had a term for the total indigenous monetary system, of which goats and sheep are denominations (1 goat or sheep usually being worth $\frac{1}{10}$ or $\frac{1}{5}$ of a heifer, depending on the society). But we don’t have such a term so I simply use cattle. But goats and sheep act just like cattle, monetarily speaking, although they are smaller denominations than are cows.

Meadows: In Narok District, there seem to be more small stock in herds, but cattle herd structures are the same, independent of this. The Ministry’s census did not include all these types.

White: There will be a national livestock census in Kenya in 1981, and it would be relatively little extra work to extend it to flock composition, which would give more information than straight herd counts. It has been reported by Trevor Wilson of ILCA that in the north Ethiopian Rift Valley, because of lack of market opportunities, almost all males are culled at an early age; hence females constitute approximately $95\%$ of herd and flock numbers.

Dahl: The question of differences between Middle Eastern and East African pastoralism relates closely to that of sheep and goats versus cattle. Small stock are a more liquid, faster-regenerating form of wealth. I question Dr Schneider’s use of undated and nonlocalized human : animal ratios. The distinction between the social and subsistence uses of livestock is false. A cow given to a stockfriend is not lost and does not disappear from the system but can still be consumed or sold. It is important to distinguish between male and female stock if we are not to blur the analysis — when we talk about cattle as food, means of production, or capital, this is simply essential.

Willby: The paper made some good points on the relative importance of meat and milk as pastoral products, especially in drawing attention to the enormous difference in minimum herd size required to maintain the subsistence milk supply in the wet and dry seasons respectively. Except where they occupy prime land with good rainfall (some were mentioned), pastoralists generally dwell in regions ill-suited to milk production — yields are severely depressed by early drought, and especially a severe season may depress reproduction and thus regeneration of the milk supply. In these
regions with an improved market for meat, I believe that pastoralists are already becoming more meat- than milk-oriented. Milk may become a treat to be enjoyed when there are genuine surpluses (there are few indigenous cows that produce more than their calves can usefully consume to convert into weight gain, that is, marketable meat) rather than a dietary staple. Herd structures may be expected to change accordingly as the immediate surroundings of Mogadishu in Somalia demonstrate; here milk has a high value whereas in remote areas there is no market for milk. In most pastoral areas, there is no feasible market for milk, which is a heavy, perishable, and immobile product, but there is a rapidly expanding market for meat, initially on the hoof. One useful field of research may exist in countries where market opportunities are equal for meat and milk for pastoral groups.

Sihm: Projects often look failures only because we had unrealistic expectations. If we had not had these failures we would not have been wiser today. I disagree that education from the outside is not useful; we need a two-way process of education. The conditions society has been offering have not been conducive to the savings of surplus. Livestock prices are depressed so returns are less, and interest rates and inflation diminish the value of marketed stock. When will we accept that whatever land can be cultivated eventually will be cultivated?
There has, in the last few years, been a burgeoning interest in the problems of the arid and semi-arid lands and the people who inhabit them. African governments and donor agencies, aware that severe ecological problems and problems of human well-being in these areas can no longer be ignored, are devoting markedly increased attention and resources to their development.

Although this concern and willingness to devote resources to the problems of the drier areas are genuine and timely, they are not matched by a clear development strategy for these areas or even a perception of what can or should be done. Expenditures and projects that have been spawned by the concern sometimes accomplish good things and install useful facilities; they almost uniformly miss, however, or are incapable of tackling, the central issue. This issue, which is at the heart of the economy and the culture of the pastoral areas and is the fundamental determinant of their productivity, is the issue of range, forage, and livestock management. The welfare and livelihood of the people in these areas depend heavily on the productivity of livestock, whether the products are consumed or traded, and livestock productivity depends most crucially on the productivity of the range and its capacity to produce edible forage. Raising the productivity and the sustainability of this system is fundamentally a task of improving range and, therefore, livestock management. Without such improvement, the economic base for self-reliant improvements in welfare is not there.

Despite the accumulation of technical knowledge on the issues of forage and livestock management, the record of development agencies in making any improvements, or even generating an increased understanding of existing pastoral situations, is abysmal. Projects and expenditures have generally been undertaken without an understanding of pastoralism and without any clear, long-term strategy. In some cases, they have clearly worsened the situation, for example by providing water and disease-control services that have led to livestock populations beyond the sustaining capacity of the forage. In other cases, they have been oversold and have led to disillusionment. Examples are agricultural options that have been enthusiastically presented and taken up in areas where soil moisture is not reliable and employment opportunities that have been promised but somehow did not
materialize or were taken up by in-migrants. Finally, there are numerous projects and expenditures that are either useless or irrelevant to the issue of livestock productivity. These include projects to introduce “improved” stock that turns out to be less well-adapted to the environment than the stock that is currently owned and those to introduce health and education that may improve the welfare or the social mobility of individuals but do not affect their production system.¹

The theme of this paper is that improvements in range and livestock productivity in the pastoral areas are not going to come from outside projects, outside management, outside coercion, or even outside education. Self-sustaining improvements can only come from institutional changes that have, or develop, roots in the local society. What happens to the long-term productivity of the range and the livestock will depend on the economic incentives and institutions and on the consequent behaviour of the local people rather than on the projects and activities of outsiders. Given the institutional, economic, and ecological environment, pastoralists are neither irrational nor ignorant. They are driven by harsh circumstances into competitive, individualistic, and highly skilled economic behaviour and also into generosity and cooperation to maintain the viability of the food production system and the well-being of their families.

The pastoralists’ behaviour, including overstocking pastoral land to the point of severely undermining its productivity, is not the result of culture-bound, “cattle-complex” irrationality, it is the result of economically rational people responding in a predictable way to the incentives built into their institutions. Changes or improvements in pastoral management will not come from coercion or education but from changes in the institutions and incentives facing individual pastoralists.

There are internal and external sources of incentive and institutional change. The internal system is the set of incentives facing individuals in their management of their herds and of their grazing resources. In pastoral situations where land is held communally and there is neither a fee nor a quota for grazing, each herder rationally and unambiguously maximizes the number of animals even if aggregate production from the range, and therefore the welfare of all the herders who depend on it, would be substantially improved by reducing the stocking rate.

The external incentive system involves the trade and economic relations of pastoralists with other producers. Whereas external relations can present problems to a pastoral system, they also provide it with a greatly enhanced ability to raise incomes and welfare and to reduce risk. Development of external trade relations not only reduces the economic isolation of pastoral societies but also opens entirely new pastoralist strategies for income and welfare maximization. These strategies coupled with appropriate changes in internal management incentives imply a major improvement in resource use and an ability of the pastoral areas to carry substantially increased populations without a decline in welfare.

¹ This is not to disparage health investments that, besides producing direct improvements in welfare from greater health, may also increase the productivity of labour. Similarly, educational investments, besides having a direct welfare effect, may be an important determinant of nonpastoral income that, in turn, can be crucial for family survival and herd regeneration in a crisis.
the productivity of pastoral lands

A defining feature of pastoral lands is that they do not reliably produce human food. With relatively minor exceptions, the primary products of the land require a digestive system that humans do not possess so that the people must depend on specialized capital equipment to put the land and its products to use. The basic raw material of the pastoral economy, the product of the land, is livestock-edible forage. As with all agriculture, land is the fixed, scarce resource of the pastoral system. Its primary productivity in forage determines aggregate output and welfare. The capital or producer goods of the system are the livestock. Like all capital goods, they are the reproducible products of investment and saving and, when they are appropriately handled by the human agent, labour, they transform the raw materials of the system, forage, into consumable and salable goods and services — milk, blood, meat, hides, transport, etc. As with any capital, the social value of grazing animals as producer goods depends on their marginal social productivity, that is, the increment in aggregate livestock production that would result from the addition of more animals on the existing pasture. This productivity depends crucially on the availability of forage. If there is available grazing in addition to the requirements of the existing animals, then adding more animals would increase total livestock production. If production would not be reduced by a small reduction of livestock numbers, then the pasture is overstocked and the marginal social productivity of livestock is zero. This value is negative when the carrying capacity of the land is exceeded and overgrazing reduces land forage, and, therefore, livestock productivity.

A zero or negative productive value does not mean that surplus livestock have no value as inventory. Producer good or consumer good inventory is worth accumulating if its value is expected to rise by more than the cost of retaining it. In the case of livestock, inventory is expensive for society to retain because it uses grazing that could be used instead to raise output. If grazing is in short supply, livestock inventories not only make unproductive use of what they consume, they may, for nutritional reasons, decline in value. Surplus livestock holdings are therefore an extremely poor way of storing the community's wealth. They are savings with high maintenance costs and negative interest rates.

These conclusions must be recognized as emerging from an aggregate or social analysis of range productivity. This approach analyzes the productivity and welfare of the group rather than of the individual. The essence of the "tragedy of the commons" argument is that the costs and benefits of the individual may contrast sharply with those of society, the group of all individuals sharing the common resource (Hardin 1968). In particular, when a common resource is shared, individual herders who own and make decisions about the livestock have little or no incentive to conserve grazing or husband it for maximal aggregate production over time, especially if this involves limiting their own livestock holdings. The incentive for individuals is to maximize their own herds so that their families can capture the maximum

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2 Capital, in the sense of a producer good, should not be confused with money. Although animals, as any valuable item, can be traded and used as payment in a variety of transactions, thus serving as a primitive money, their value, unlike money, tends to be determined by their physical producer or consumer good characteristics.
benefit from whatever grazing is available to the community. The inevitable result of the unbridled accumulation efforts of each family is the characteristic pastoralist cycle of livestock population buildups followed by disastrous crashes as the forage is exhausted.

The effect of overgrazing is increasingly evident in the pastoral areas. Although a number of the most productive and palatable grasses and shrubs tolerate and even thrive under heavy grazing, plants depend on their green leaf surface areas to produce food. If the grazing is such that plants are excessively denuded of leaf, not only do they not produce, they die. Optimal management of grazing implies the growth and nurturing of grass that is eaten and then allowed to regenerate. If edible plants are not permitted to grow and regrow, they are replaced by plants that are either unpalatable or inaccessible to livestock. Any plants with palatable leaves survive by the expedient either of keeping their leaves out of the reach of livestock as in the case of trees or of developing such an arsenal of thorns that their leaves are protected. This species selection implies a major decline in the ability of land to support livestock production. Well-conceived range management implies considerable effort and expenditure in specifically encouraging the growth of livestock-edible plants and discouraging or trying to kill the others.

Plant species degradation turns to soil degradation in areas where the complete removal of the grasses and other ground cover has left the soil with an impaired ability to retain moisture, chronically exposed not only to livestock hooves but to sun, wind, and rain. Although species changes are reversible (albeit requiring considerable time and investment), soil erosion can be regarded as virtually irreversible.

As the essence of productive range management is to ensure that livestock-edible plants grow and are then eaten by livestock and because permitting such plants to grow and provide forage is fundamentally a task of livestock control, the most basic task of range management is the control and deposition of livestock. In short, forage availability depends on forage species being grazed but not destroyed, that is, on the deliberate preservation of plants for future regeneration and consumption and on deliberate livestock management to that end. The problem is that the economic incentive for the individual herder to undertake preservation is only there if that herder can count on being the beneficiary of the additional forage so generated. Neither coercion nor education can be expected to initiate modifications in behaviour if they run counter to the economic incentives inherent in the existing institutions and tenure arrangements. Coercion, even if it succeeds, does not result in a sustained change in behaviour, and attempts at policing have a dismal history of backfiring. Extension advice, which has been liberally provided to pastoralists at considerable expense by numerous agencies, if it is perceived to run counter to the economic interests of the recipients, merely undermines the credibility of extension personnel. The familiar pattern is of pastoralists' politely listening and perhaps genuinely agreeing and then going ahead and doing exactly what they were doing before.

**pastoral tenure institutions and incentives**

There is generally an explicit understanding among pastoralists that the control of livestock numbers and their deposition are the most fundamental tasks of any effort to maintain or improve range and, therefore, livestock
productivity. Under existing circumstances, however, the prime characteristics of pastoral institutions and tenure patterns militate against any incentive for individual herders to control their livestock numbers. If it can be assumed that the economic behaviour of an individual is determined primarily by economic incentives, behavioural change will only result from changes in those incentives. Any alternative change implies an assumption that pastoralists are ignorant or irrational in response to the incentives or the environment that confront them. In an area as central to pastoral peoples' livelihood and well-being as livestock management, such an assumption is untenable.

In the first place, land, or the forage it produces, is the scarce economic resource, and the benefits of this resource only accrue to an individual as a result of livestock ownership. The owners of many animals are large beneficiaries of the communally held land, and the owners of no animals do not benefit at all from their joint ownership of the land. (Such individuals may benefit from their labour in stock associate or borrowing arrangements where the benefits they receive can be thought of as a wage, but this transaction is analytically quite separate from the returns to land ownership.) Livestock ownership therefore assumes the role of land ownership in an agricultural society. The more livestock an individual owns, the more the benefits of the community’s land accrue to that individual. Under these circumstances, destocking, which is the standard solution to the problem of overgrazed and denuded rangeland, does not appeal to individual livestock owners, however correct it may be from the point of view of aggregate range and livestock productivity and however much the community may realize that the land is overstocked. Just as in agricultural communities where land rights tend to be sacrosanct and attempts at land expropriation face resistance from landowners, the rights to livestock in pastoralist society are surrounded by detailed legal traditions and sanctions, interference with which strikes at the heart of the society’s system of distributing wealth and power.

The second and related characteristic of communal grazing systems is that communally held resources tend to be overused and misused from the point of view of society. Air and water pollution are familiar cases. Similarly, uncontrolled communal fishing or wildlife hunting rights tend to deplete the resources, even wiping them out. For the last bison on the range, the logic of the individual hunter is: “if I don’t get it somebody else will.”

In the pastoralists’ case, attempts by individuals to preserve or raise land and forage productivity by reducing their herd merely allow the livestock of others to consume a larger share of the forage. Because an individual’s stock control is not necessarily matched by the stock control of others the forage preservation attempt is ineffective, and the one who destocks ends with a smaller share of the communal forage. Whereas the benefit to the group of a reduction in aggregate livestock numbers may be high in terms of land and forage regeneration, the reduction in an individual’s herd of potentially productive animals (i.e., productive if only grazing were available) is likely to be seen as an unmitigated reduction in a family’s ability to maintain its food supply and regenerate its productive capacity in the event of a disaster. There is generally a tradition of the group leaders setting aside pastures for certain seasons to allow for regeneration, but even these restraints are hard to preserve in the face of excessive livestock numbers, especially when the rest of the grazing is exhausted. The group seldom if ever has the right to decide
for the individual on the crucial issues of livestock ownership, numbers, and disposals.

Perhaps the best analysis of an individual's herd management strategy in a communal grazing situation has been undertaken by Dahl and Hjort (1976). It is very clear from this analysis that, for the individual herder, herd maximization is the strategy of choice. In particular, herd strategy must be geared toward survival and the amelioration of risk, the principal risk being drought. An additional imperative to which herd strategy must be addressed is recuperation after drought. Apart from the fact that the larger herd owners can better survive livestock losses, Dahl and Hjort point to herd dispersal, the separation of the total livestock holding into different herding units, and species diversification within the herd (i.e., the appropriate mix of cattle, sheep, goats, camels, and donkeys) as being particularly important for ensuring both a continuous food supply and a capacity to regenerate a herd in the event of disaster. The more animals an individual owns, "the larger the group of people he can feed, and the more labour he can control," to build up and manage livestock holdings. Dahl and Hjort (1979:20) conclude:

Any herdowner strives to control a maximal number of productive animals either directly by keeping them in the herd that he manages himself or more indirectly in the form of claims to the stock managed by other persons.

In contrast, the optimal herd strategy for the group is aimed not at the maximization of livestock numbers on the land but at the maximization of aggregate livestock production from the land over time. The essence is not herd buildup in anticipation of inevitable losses; it is grazing and forage management to coax the maximum useful plant production from the land over time and turn it into the maximum consumable or salable livestock production. The optimal mix of livestock products depends on their relative values to the pastoralists and how much of each can be produced for a given unit of forage.

The words "over time" have been used to reflect the tradeoff between consumption now and consumption later. In periods of hardship, future benefits tend to be more heavily discounted in favour of current consumption requirements, but regeneration, survival, and well-being in future are not ignored, even in circumstances of extreme privation. The group management strategy in this regard is concerned with the preservation, the regenerative capacity, and the aggregate yield of the pasture. In an impending drought, the question is not "do we have enough animals" but "do we have enough grazing?" Animals, without grazing, are recognized as unproductive just as is grazing without animals, and livestock disposals and acquisitions are undertaken accordingly. Because the primary productivity of the land is recognized as the basic determinant of livestock production and human welfare, livestock management and grazing strategies are not only geared toward maintaining land productivity over time, but specific investments, such as the clearing of unproductive species of plants and the establishment of more productive and edible species, are undertaken to improve it.

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3 This question has obvious implications for livestock marketing arrangements, a crucial component of any livestock development strategy.
distribution of income and wealth

It is frequently not recognized by casual observers of rural societies in Africa that, as with societies elsewhere, there are often large interpersonal disparities in income and wealth. Although in agricultural societies the basis for the disparities is principally land ownership, in pastoral societies it is livestock. Livestock ownership is the only means of access to the benefits of grazing land; the economic returns from the land are, thus, highly concentrated in the hands of the large herd owners.

As has been widely observed by anthropologists, there are numerous ways of distributing consumable or salable products — wealth — within pastoral societies (as in other societies). These distributional mechanisms fall into two main, and not entirely distinct, categories. The first category can, somewhat inappropriately, be labeled charity. As is generally the case, this subsumes a wide range of culturally defined intrafamily and intragroup obligations on the wealthy to provide for the less wealthy. It also covers formal or informal reciprocal arrangements that have developed as means of dealing with risk and the fluctuating fortunes of individuals and families. In some arrangements, a relationship of equality may be maintained between the two parties, but frequently the stockless party is dependent on the generosity of the person making the gift or loan; what is given is not received by right, and if times are hard it simply cannot be claimed or, in the case of a loan, may have to be repaid. Finally, this category has political implications as a wealthy individual accumulates dependants, supporters, and, thereby, power within the society.

The second category of mechanisms for distributing income sometimes has the appearance of charity but more properly falls under the heading of hiring labour. This hiring generally does not involve a cash wage or a specific employee relationship; it involves cattle associates, livestock loans, and the like where cattle ownership does not change hands, but herding and other tasks are performed by someone other than the owner of the stock, with benefits, in the form of produce, young stock, etc. accruing to the one who provides the labour. Although this labour market is not perfect, ability and diligence are rewarded, and the benefits accruing to labourers are related to labour scarcity. The returns to labour, which might be garnered from work inside the pastoral economy or outside it through migration, are quite distinct from the returns to land. They depend not on land rights but on livestock ownership. The pastoralist without livestock is in the same category as the farmer without land.

The distribution of livestock ownership is a major determinant of the political economy of the pastoral society, and destocking measures are likely to get at the heart of ownership distribution. If aggregate numbers are to be reduced, who has to give up animals? Those with few animals may not survive a reduction. Those with many animals are likely to have the political power to resist changes that they perceive as redistributing income, wealth, and power adversely for them. It is easy for outsiders to see the benefits of redistribution but, as with all societies, a sustaining rationale has been built up to which even the relatively dispossessed tend to subscribe. Individuals with few livestock, or none at all, may be conscious of the fact that large herd owners are taking a disproportionate share of the communal forage, but they generally do not question the right of individuals to have as many animals as
they can accumulate. They merely hope to accumulate more themselves. There is no question that the right to own, accumulate, and graze animals, like the right to own land in agricultural societies or the right to own vehicles, houses, and productive equipment in capitalist societies, is at the heart of the economic power and distribution system and is legitimized by cultural tradition. Interference with this right involves ingredients of what can only be called a social revolution.

innovation in pastoral institutions and incentives

The problem that lies behind the wholesale mismanagement and denudation of the communally held pastoral areas is that current incentives and institutions do not encourage productive range management because the economic incentive for the rationally motivated herder is to maximize the number of animals. Maximizing cattle numbers is not an irrational cultural holdover from a period when land was truly abundant and cattle were scarce, nor is it a neurotic or aesthetic hangup, a cattle complex psychosis that will be cured by time or education or "coming into the 20th century"; it is the rational consequence of current incentives and institutions.

A system that reflects economic realities informs individual herders that the land, grazing, and forage are the resources to be husbanded. It informs them that grazing has a high value and opportunity cost and that a judgment constantly needs to be made with regard to how the grazing is to be used, maintained, and improved and with regard to whether the additional production from each animal is worth the additional grazing it consumes.

Group ranch adjudication in Kenya is one attempt by government to provide pastoralists with an incentive to avoid range mismanagement. It is a tenure innovation that has generally been welcomed by pastoralists as giving their land rights better security. Although group ranches may have provided an institutional base for further innovation, they have generally not succeeded either in addressing the issue of the incentives of the individual herders or of establishing a management system that is in the group's interest.

Two other land tenure innovations must be examined in the context of the familiar difficulties they present. They both motivate individual herders to behave appropriately with regard to the range and forage without compulsion or persuasion. The first is the option of land enclosure into individual holdings. The second involves the maintenance of communal grazing but including a specific price, in the form of either a livestock quota or a specific fee for the grazing that an individual livestock consumes. A grazing fee defines the grazing as the property of the group and is payable, by whichever individual uses the grazing, to the group that jointly owns the land. A quota divides the grazing between the individuals with rights to the land so that animals in excess of one's quota may not be grazed. The fact that a quota can be rented out to other herders (or, conceivably, even sold) indicates that the grazing fee and the quota have the same general effect. The difference is that the grazing fee goes to the group organization, with whatever distributional problems may arise beyond that, whereas the quota use or rent accrues directly to the individual.

As both of these innovations involve a redistribution of land rights and benefits, strong opposition to them can be expected from those who are
currently enjoying a disproportionate share of the economic returns to land, i.e., the owners of relatively large herds of livestock. As has been pointed out, these individuals are accustomed to the lion's share of the communally (equally?) owned land and forage. Distributing such land rights equally may be in line with the theory of communal ownership, but it is in stark contrast to the reality of the way in which benefits are currently distributed. Redistribution of real resources and income is seldom accomplished without a reaction from those who are hurt by the measures. Perhaps the fundamental determinant of whether or not the changes in land rights will occur is the relative power of those who will be hurt and those who will be benefited by the redistribution, the large herd owners and those who own fewer or no cattle. The familiar political question is whether the relatively dispossessed can be mobilized.

The last innovation to be mentioned does not involve any change in communal grazing systems nor necessarily any change in income distribution patterns. It is, furthermore, related to methods of grazing management that, in a number of pastoral societies, have a long tradition. It basically involves dividing a pastoral land unit into blocks and rotating the livestock herds between the blocks. The idea is that the forage in the vacated blocks has a chance to regenerate before again being subjected to intensive grazing. If block grazing can be enforced, and the problem is that traditional mechanisms for this enforcement have frequently broken down, then it is likely that the primary productivity and, therefore, the livestock productivity of the range can be increased.

The innovations are not mutually exclusive. Group ranches, for instance, may become the basis for rotational grazing schemes or for one of the other rationing devices mentioned. The innovations that make sense vary markedly between different ecological circumstances and different cultures. Above all, there is no innovation that will work without the acceptance, the agreement, and the initiative of the people concerned.

group ranches

The logic behind initiation of group ranches in Kenya is that the herders who are the joint beneficiaries of any improvements in range and forage management should be made responsible for the area through joint ownership of the land. As the increased livestock product and income generated by stock control accrues to the group, it was hoped that the group would have the incentive to modify its management practices in its own interests. Group ranch establishment, therefore, involves the adjudication of the range into discrete units, each with members who jointly own and are responsible for their ranch. A group ranch committee is then set up to manage the ranch in the interests of the group.

Several distinct problems have emerged and have resulted in widespread disillusionment with group ranches. The first is simply the ecological problem that the ranches are generally not large or diverse enough to encompass the migratory patterns of pastoralists seeking to exploit the discontinuity and diversity of their environment. The general pattern within the group ranches has been that, when the need arises, adjudicated
boundaries are virtually ignored and traditional notions of reciprocal obligations to those from other areas reassert themselves. The fundamental logic of a group restricting its livestock numbers to the carrying capacity of its own ranch and, in turn, benefiting from the grazing that it has been able to preserve is thus subverted.\footnote{Anthropologists who restrict themselves to these palatable but ineffectual options lose their ability to assist in what may be a vital process of institutional change. They may also unwittingly be aligning themselves with the wealthy elite in the societies they are trying to protect.}

If ranch boundaries are not regarded as sacrosanct, their entire logic is undermined. If a particular group succeeds in preserving grazing for the dry period or, in the longer term, improving the quality of grazing, both of which require management discipline and livestock control, and if the preserved or improved grazing is then eaten by others from outside the group ranch, the incentive for the group to maintain its management discipline is no longer present. If grazing and livestock management are not restricted to the boundaries of the ranch, there is no incentive for the group to behave rationally with regard to the resources.

The main reason for the willingness and even enthusiasm for group ranch adjudication in the pastoral areas has been less the range management logic behind it than the desire of groups of pastoralists to provide themselves with legal protection for their traditional range areas. The increasing scarcity and value of land and the consequent encroachment of land-hungry people from elsewhere, not to mention the land-grab machinations of certain of their own members, are not lost on pastoralists, and group ranch adjudication, even if it is no more than a title deed, provides some feeling of security against outside or inside land claims on what has been the traditional grazing areas of a particular group.

Perhaps the most basic problem of the group ranch is that it does not change communal grazing incentives. Land is still owned communally and livestock individually. Individuals who are maximizing their family’s welfare still have the economic incentive to accumulate as many cattle as possible, regardless of the carrying capacity of the land.

Whereas the group ranch has a clear structure and mechanism for exerting its authority, committing the organization, and making management decisions on the ranch, the general experience has been that these mechanisms degenerate in practice to a state of total paralysis. Meetings of group ranch members are hard to organize and hard to conduct; yet the quorum required for any binding decision is 75% of the membership. The group ranch management committee is supposed to be a standing committee, elected by the members, but, despite its title, its authority is generally negligible, especially when it comes to the crucial issues of the control of livestock numbers, ownership, and grazing. The committee has no legal basis for asserting its authority. It certainly has no accepted mandate to require group ranch members to sell or dispose of their animals. In short, the group ranch can be regarded as an ineffectual device for imposing the interests of the group, which are the optimal utilization, maintenance, and improvement of the range and forage productivity, over the interests of the individuals, which are the maximization of personally owned livestock herds.
individual holdings

Although enclosure presents problems that will be discussed, subdividing a communal pasture equally among those who have rights to it tends to lead to a reduction in livestock numbers, a better management of the grazing resource, and a rise in aggregate livestock production. An additional effect is that the livestock holdings and benefits rapidly become more equally distributed among the people who have rights to the land.

Livestock owners who also own the piece of land on which their animals depend are quickly faced with the reality that their income and livelihood depend on the primary productivity of the land and on the skill with which the forage is maintained and improved. Coercion with regard to range management measures under these circumstances is simply unnecessary.

From the point of view of livestock selection and culling, furthermore, a livestock owner who is limited to the forage that grows within given boundaries will be under strong economic pressure to select those animals that make the best use of that forage. Old or unproductive animals consume fodder that could better be used to feed more productive animals. The forage resources, in other words, have an opportunity cost in the livestock products they could be producing when put to their best use. These resources are worth saving and improving for the future use of the individual. Both livestock management and land management are motivated in these circumstances.

In the southern part of the Baringo District in Kenya, for example, the land has been adjudicated into individual ranches. Although the ranches are not large (50–500 ha) and face the inevitable problems of a semi-arid area livestock economy, there has been a remarkable recovery in the productivity of the land. In a number of ranches, reseeding has been undertaken, but the basic explanation for the improvements in land and livestock productivity has been stock control. Grass and forage are increasingly regarded as a crop to be husbanded. Ranchers may graze cattle on each other’s ranches, but only if a grazing fee is paid. Grazing fees vary between areas; in some areas fees as high as Ksh. 20–25/month are payable. More typical fees in this area are Ksh. 8–10/month, depending on the services offered, the quality of the stock and the quality of the grazing.

In the more northern pastoral area of the district, any attempt at enclosure, except temporary enclosure for agricultural purposes, has been strongly resisted and, with one significant exception, has not succeeded. The exception is the undertaking of a government employee from the area, James Rotich. His job for many years has been range extension work, particularly in the area of grazing regeneration, a technical area that has not, for reasons that have been discussed, been notable for its success in the pastoral areas of the district.

Following some government reseeding trials at Kipcherere, a heavily eroded, stony area where many years of overgrazing have virtually annihilated palatable grasses, Rotich decided to enclose about 15 ha of his own. He used the existing thorn bush cut from the land to make a dense, impenetrable fence around the area. He seeded the grass by hand and allowed it a full season of growth without being grazed. In the dry season, he burned the grass and waited for the next rains. With the rains came a thick, lush growth of grass that he has carefully protected from other livestock
owners and has skillfully grazed ever since. Despite the extremely rocky appearance of the ground, the plot is literally covered with a dense swath of palatable grass, in stark contrast to the surrounding area. While the rest of the area has been continuing to lose soil, moreover, the ground cover has arrested erosion in the enclosed area.

Rotich’s management system has been one of ensuring that the grass grows, then grazing it hard, and finally removing his animals before its regeneration capacity is impaired. Shrewdly, in the circumstances, he has principally been buying animals that are not in the best of condition, feeding them, and selling them for a rapid turnover.

Although Rotich apparently has no greater right to the land than anyone else in the area, he has, by a combination of determination and bluff, staked out what amounts to a personal land holding. He has resisted all efforts to persuade him to open the plot to public grazing and has defended it ferociously against would-be intruders. The bluff has been that it is more-or-less a part of the adjoining government plot that was officially designated for trials and demonstrations. In fact, virtually none of the visitors to the site so much as visit the official plot. Rotich’s plot thus provides the principal trial and demonstration of what is possible in the area.

A further enclosure was attempted, this time between Marigat and Ndau, by a person named Arkut Tekenya. Tekenya’s efforts followed Rotich’s pattern with the exception that Tekenya’s disputes with the local elders and people were more vociferous and less successful. He eventually spent about Ksh. 3000 in fencing and guarding his plot. He also made a major effort to get official recognition and support for his enclosure. Whereas these efforts were apparently received with some sympathy by the district administration, the legal basis for his rights to enclose and alienate the plot was not there. There was thus nothing that the administration could do in his defence. The final denouement came when a group of local herders, angered by the sight of the abundant grass inside Tekenya’s enclosure from which they were being excluded, broke down the fence and grazed the plot completely out. The plot is now bare of any grass or edible ground cover, indistinguishable from the rest of the area. Arkut Tekenya’s case is an enclosure that failed.

problems of enclosure

Despite the appealing aspects of enclosure from the point of view of motivating improved range and livestock management, enclosure presents problems that must be faced in assessing its feasibility. Whether or not these problems are insurmountable and whether enclosure is desirable will vary from place to place.

The most basic problem is that rainfall patterns in semi-arid areas mean that a particular piece of land may not get adequate rain in some years to support the adequate plant growth. It is to cope with this problem of unreliable and patchy rainfall that migratory patterns have been adopted. Migration is not precluded by individual ownership rights to land; livestock movements onto hired grazing are undertaken in private ranching areas. Where holdings are small, however, such transactions can be cumbersome. Where the aggregate grazing is inadequate, ranchers are forced, not by administrative edict, but by economic circumstances, into destocking. The alternative, which is the one too frequently adopted in communal grazing, is widespread livestock death from starvation. At least in private holdings, there
is a strong motivation for the herder to plan livestock numbers and sales in conjunction with the availability and the optimal management of the forage.\(^5\)

A further problem is that the holdings resulting from division of the land among all those with rights to it would be small. For a number of ranch investments and services, there are considerable economies of scale. This is particularly true for services relating to water supply and disease control. In south Baringo small ranch owners share services, such as dips and communal water systems, through ranching associations. These associations have also devised a system where the member ranches are jointly responsible for the financial obligations. They are thus able to procure the size of loan necessary for dips, reticulated water systems, etc. serving a number of members jointly, as well as fencing, paddocking, and other investments for individuals.

A serious problem with an enclosure movement is that it tends to be undertaken in a highly inequitable fashion. In a number of the pastoral areas where individual ranches have been established, the pattern has been that holdings are demarcated and claimed in the best grazing areas and that the sizes of the demarcated ranches are substantially in excess of any possible average or equitably sized holding. This kind of enclosure creates an increasingly impossible situation for those who are squeezed out and overcrowded onto the worst land. It is this tendency for a land grab, generally favouring the individuals with the foresight and the power to establish and enforce the enclosure of their own chosen ranches, that creates nervousness among other herdsmen and entrenched opposition to any attempt at enclosure. It is crucial that any enclosure movement be carefully overseen and, above all, that it be undertaken in an equitable and open fashion with the close collaboration and initiative of the local people.

If enclosure is the ultimate aim, it must be undertaken in realistic phases and as people are ready for it. Perhaps group ranches will turn out to be an intermediate phase on the way to subdivision into individual holdings. There are certainly some Kenyan officials who see group ranches in this light. Subdivision of a group ranch, in accordance with the wishes of group ranch members, is clearly a more feasible proposition than the enclosure of the open range, where even the notion of land ownership rights and land alienation is anathema. In some areas of the country, where group ranches have been established and operated for many years, the dissatisfaction of group ranch members is already being expressed as pressure to subdivide the ranches into individual holdings. The source of this pressure appears to be the more progressive members who are frustrated by what they see to be the mismanagement of group ranch resources and who feel that they could do better on their own.

**livestock quota or grazing fee**

A grazing fee is a way of maintaining communal grazing while informing livestock owners that grazing and forage are the scarce resource to be economically husbanded rather than being used in a wasteful or destructive manner. A charge for grazing compels the livestock owner to examine

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\(^5\) Hedlund (1971) describes how shrewd families among the Kaputiei Maasai placed members in each of a number of group ranches to facilitate such movements should the need arise.
nutritional, capital growth, or output benefit of keeping each animal and compare the results with the grazing fee. The overall result of the multiple individual decisions with regard to maintaining or disposing of livestock will, if the fee is correctly set, produce both an appropriate selection of animals and an appropriate stocking rate on the land.

First, a grazing fee provides strong economic pressure to eliminate animals that are relatively unproductive. Because herders currently do not pay for grazing, herds are heavily loaded with animals that are using forage in a fashion that is wasteful from the point of view of production. Immature males, for example, might be better sold for fattening elsewhere. Efforts to persuade or coerce owners to part with such animals, when they have no economic incentive to do so, have a hoary history of failure. Second, a grazing fee encourages herders to look at grazing from a somewhat different perspective. They will continue to move around the range in search of the best grazing and in response to rainfall, moisture, and plant growth patterns. They will not, however, hammer the pasture beyond the point where there is available growth. It is this hammering that strips and eventually uproots all edible plants, destroys new seedlings before they have the chance to grow, and eventually leaves the ground bare, trampled, and inert.

Above all, a grazing fee puts the livestock owner under pressure to sell animals rather than keep them regardless of their cost in terms of forage consumed. The result is both a reduction in aggregate numbers of animals and an improvement in their quality. The cycle of rapid and uncontrolled buildup in livestock numbers followed by catastrophic losses is thereby broken.

A grazing fee that is paid into a communal kitty on the basis of the number of animals a herder owns and is disbursed equally to those who have ownership rights in the land provides what amounts to a rental income to each individual, regardless of livestock ownership. People with average numbers of livestock would then be receiving just what they pay, those with larger than average herds would be paying more than they receive, and those with few or even no animals would be receiving some benefit from their land rights without being required to build up herds.

In a communal situation, livestock-related services and facilities should also be paid for in proportion to an individual's ownership of livestock. This, again, is simply a consequence of the fact that livestock is individually owned so that all the benefits of the investments, be they for disease control, livestock water, or paddocking, accrue to the livestock owners. In some cases these charges can be handled as a fee per animal. In other cases, group loan obligations and other expenses must be borne by livestock owners in proportion to the numbers of animals owned. Not only is this the only equitable way for these expenses to be met, it also brings home to the owners of animals the costs that they incur. It is precisely the failure of most communal systems to do this that leads to misuse of communal resources. Specifically, a livestock-based fee system discourages the keeping of animals that, from the point of view of the local economy and environment, should not be kept.

Enthusiasm for the notion of a grazing fee should not be anticipated, especially from the owners of relatively large herds of cattle. Paying for a resource that has such a long and culturally embedded history of being freely available (or at least free, even if not always available) is an innovation that is likely to have its legitimacy seriously questioned. Grazing fees were an
integral part of a number of grazing schemes in the colonial period, and they undoubtedly generated considerable antipathy. It is hard, however, to think of any fee or tax that creates much enthusiasm among those who must pay. A particular problem with earlier grazing fees was that they were regarded largely as a livestock tax, accruing to a fundamentally foreign authority. It is possible that payments to the group ranch will have rather greater legitimacy, especially if the decision to impose them is made by the group. Nevertheless, any decision to initiate a grazing fee must be undertaken in full anticipation of entrenched opposition, especially from owners of large herds. Quite apart from the politics of the decision, furthermore, the sheer mechanics of assessment and collection, and the responsible handling of the funds once they are collected, all create difficulties and problems.

The option of a grazing quota for each group ranch member is, in many respects, equivalent to a grazing fee in terms of the incentives it provides. The quota permits each member the right to graze a given number of animals, with the aggregate number set in accordance with the carrying capacity of the land. Again, individuals are equal beneficiaries of the land in that they could, even with no livestock of their own, rent their grazing rights to those who have more cattle than permitted by their quotas. A fee for grazing would, in this fashion, develop, perhaps payable in kind or in some other benefit. If the quota were effective, so that livestock without quotas were effectively excluded, a market and a going price for a grazing quota would emerge. This would have exactly the effect of a grazing fee distributed equally to the members except that any payments, in cash or kind, would be made directly to the quota holder. The quota system thus has the attractive feature of defining the land as the property of each member and providing each member with a means of benefiting from the land without the necessity of introducing additional animals, animals that, in an overgrazed situation, merely reduce the aggregate productivity of the range.

**block or rotational grazing**

The essence of block grazing is the exclusion of all animals from specified areas in specified seasons or years to allow for grazing regeneration. The land is divided into blocks between which all animals rotate in a sequential fashion, and no herder is allowed onto a block that has not yet been “opened.” Once it is opened, there are no controls on the grazing until it is again closed.

The basic problem with communal rotational grazing is how to remove the livestock from a particular block as soon as the grazing is exhausted and before the destruction of its regenerative capacity and, similarly, how to keep the herds from entering a closed block until the plant life has had a chance to recover. Given the pressures of communal grazing and herd accumulation, traditional mechanisms have generally proved inadequate. In circumstances where aggregate livestock numbers are such that forage is exhausted in one block before it has had a chance to regenerate in the next, the pressure is less to reduce herds than to jettison the system of controls.

In some cases, especially where new grazing areas have been opened by the construction of water pans and dams, an attractive self-regulating mechanism has been attempted. Dam sizes have been planned so that when the grazing is exhausted, the water will be also. In areas where boreholes
have been installed, attempts have sometimes been made to turn off the
pumps before grazing destruction sets in. The results of these attempts have
generally been such anger that pumping equipment is deliberately de­
stroyed. This has led to proposals that pumps and equipment be removed to
the next block, again forcing the livestock to move to where there is water. In
general, as anyone who has been thirsty and without water in a hot and arid
environment knows, tampering with what is regarded as a possible water
supply is an explosive activity.

The fundamental issue of the grazing distribution between claimants is
not addressed in communal rotational grazing schemes. In a place such as
Lesotho, where the timing of the transhumance between the mountains and
the farmlands is tightly controlled by the chiefs, principally to protect the
agricultural crops, the access to the mountain grazing in the summer is
basically decided by the prowess of the herders, frequently in physical
combat. Although such behaviour does not appear typical among pas­
toralists, the pattern of increasing overgrazing and trampling around a water
point, rather than a more even exploitation of the available grazing, is clearly
the result of each herder's competition for the grazing that is close to water. A
more rational approach to grazing would carefully avoid such a pattern.

**implementation**

There is no question that the introduction of a quota system, like
subdivision of the land, the introduction of a grazing fee, the introduction of
strict rotational or planned grazing, compulsory disease control, or any other
change in the way individual herders have been able to operate, will raise
intense opposition. This opposition can particularly be expected from the
owners of the relatively large herds. The notion that such herd owners, who
are regarded with some truth as self-made individuals who have built up and
nurtured their herds by their own skills and efforts, should now be required to
compensate or pay anybody for their right to graze as many animals as they
have, regardless of quotas or grazing schemes, is certainly foreign to the
existing norms of the culture and economy. However, the conflict with
existing culture applies equally in the case of the group ranch (excluding
nonmembers from the grazing), or any other measure related to range
management, grazing, or stock control. Furthermore, those who propose that
no changes be undertaken that might interfere with existing cultural
perceptions and that more rational stock and grazing control is somehow
wrong or infeasible have had to watch periodic destocking to the point of
decimation of the cattle herds by wholesale starvation. They have also had to
watch the decline in range productivity, as ground cover and palatable forage
species are replaced by unpalatable or inaccessible species of plants, as the
soil is laid bare, further trampled, and finally removed by erosion.

Human population projections, on the one hand, and the process of
desertification, on the other, give pause. An anthropologist's goodwilled
attempts to protect every detail of a culture may contribute significantly to the
problem. They may impede the healthy process of cultural adaptation and
institutional innovation in progress and that may now be necessary to avert
more serious declines in human welfare and in economic and ecological
sustainability.

If institutional innovations are in progress and are now required in
pastoral areas, which, then, are the directions to go? This paper has presented the view that the innovations that are required are in the direction of institutions and incentive systems that motivate the individual herder, without external mechanisms of policing and coercion, to consider the long-range productivity of the land and the forage on which livestock productivity and human welfare depend. It is hard, in this context, to escape the conclusion that innovations are required in the area of land tenure and land and grazing rights, despite the extreme sensitivity of this topic.

discussion

R. Dyson-Hudson: I believe the term “charity” is misleading when applied to pastoral transfers, because of its connotation of altruism. “Investing in social relations” might better describe how wealthy herd owners use their surplus livestock.

Hopcraft: Although I do agree that charity is not quite the appropriate word for these transfers, I used it to highlight the fact that the recipients do not have a right or a legal claim to what they receive. Contributions to the poor may be made by people who are conscious that they themselves may, at some point, be the beneficiaries of the system. As Dahl and Hjort point out, however, a number of these loan and transfer mechanisms are unreliable for the recipient who owns no livestock, and frequently they break down when they are most needed, that is, in situations of overall hardship.

Meadows: First, I am not convinced that in some rangelands overstocking necessarily leads in the long term to resource degradation. For instance, the western and southwestern areas of Kajiado are in as good a condition as they have been in the past 20 years, despite a long history of overgrazing. In fact the longer I am in the business (20–30 years in range and grazing management), the more I am convinced that the problem of overgrazing has been exaggerated. Second, pastoralists do not maximize herd size (young bulls are removed from the herd and older bulls and culled cows are sold). What is maximized is the pursuit of subsistence needs and protein. Thus, they do not maximize total stock numbers but consciously try to dispose of bulls, definitely desiring to market 3-year-old males. Third, Peter Hopcraft’s theory that secondary resource productivity (meat and milk) is enhanced when stock ratios are optimized is not borne out by Porter’s work, which shows deliberate overstocking has led to enhanced weight gains, per unit area, by cattle. Fourth, the history of group ranches in Kajiado is not one of unmitigated failure. Some show economic and social success, such as in enhanced milk production through the introduction of Sahiwal animals, a massive increase in primary school attendance and investment in motor vehicles, which facilitate communication and the transport of consumables to people’s homes. However, defined grazing on the group ranches has failed, primarily because zebra and wildebeest broke down the fences.

Mpaayei: First, I have heard nothing about indigenous range management systems. For instance, the Maasai Emurua unit shares water and grazing and makes decisions with a traditional committee. The unit comprises around 16 homesteads, for each of which there is an agreed pattern for moving livestock. At Oloishoibor, south of Nairobi in the Keekonyokie section, cattle graze on Ngong hills and elsewhere only at certain times of the year. The disastrous opening of the Mau hills to wheat has precluded periodic use of
this area by Purko pastoralists. Thus the principle of resting and rotating land is not new to Maasai. Second, nothing has been said about game and the competition it poses to domestic livestock. In effect, the Maasai suffer for harbouring game animals that then compete with their own cattle. Third, why is nothing said about sheep and goats and their place in the struggle for survival in arid areas? They play a key role in drought, and when goats’ milk is used, it is a sign for famine relief to begin. Small stock should not be ignored. Fourth, why is it assumed throughout the discussion that the Maasai themselves have no views about suggested improvements (or otherwise) of range management?

Hopcraft: On the first point, there are agreed grazing patterns among pastoral communities, and these generally represent a great deal of local wisdom. The problem is, for instance, that in 1976 cattle flooded into Ololshoibor from all over Kajiado, and the local people found that the forage they had been counting on was consumed by others. The result was a tragic loss of livestock. Traditional grazing rotations and controls are hard to maintain if there are too many cattle and too little forage. In these circumstances the onset of disasters is hastened, as animals destroy what little forage remains.

On the second point, given the limits of the forage, there is inevitably a contest for that forage between wild and domestic animals. If herders get no benefits from wildlife they are unlikely, when grazing is short, to be interested in its conservation. In ranching and pastoral areas, unless people can see some economic benefit of wildlife, the wildlife tends to be pushed out. Although these animals are highly efficient users of the range, the fact that most livestock owners have no way of benefiting from their preservation means that they are not likely to be preserved without external intervention. It is possible that the presence of wildlife motivates higher stocking with domestic animals, merely to reduce the amount of forage these wild animals consume.

Little: I think the author has slighted the fact that most pastoralists are well aware when an individual’s private interests infringe upon the community’s collective interests. In the area in which I am working, collective pressure is sometimes brought upon large herd owners to move their herds when communal resources are being too heavily exploited.

Hopcraft: Little has said that he recognizes that pastoralists are aware when their collective interests are infringed upon by individuals’ acting in their own interest. The lack of adequate institutions for imposing the group’s interest on the individual livestock owner appears to be a problem.

Dahl: Hopcraft refers in his presentation to entities such as groups and societies and the conflict between group interests and individual interests. How does he define these entities? The individual herd owner usually benefits from being a member of a political unit competing with other political units over access to land. Hopcraft’s model seems to assume a colonial situation of strict grazing boundaries between ethnic groups. The situation of Borana and Somali in northern Kenya clearly illustrates such assumptions are not well founded.

Hopcraft: Perhaps the most dramatic competition for grazing is between groups. Establishing boundaries between them may result in quasimilitary confrontations or, if such activities are restrained, in intense political
maneuvering. A number of these disputes have been brought to a head where group ranch adjudication implies a boundary between ethnic groups in Kenya. Boundary disagreements in Baringo District, for instance, have caused long delays in adjudication. In any of these circumstances, a group's solidarity can be crucial for winning a political or physical battle with a neighbouring group. But functional solidarity within a group when confronting other groups should not blind us to the competition for grazing within a group. Within a group, mechanisms tend to develop for restraining conflict, but there is no hiding the fact that the grazing consumed by one family's livestock is not available to the next family's.

At the lowest level of the group is the family. At the next level a clan or group of families may define its area with an implicit allocation pattern within it against other clans. Two clans may, in extremis, reciprocate grazing rights, but two ethnic groups probably will not. These patterns of cooperation within, and tension between, groups differently defined are familiar to anthropologists.

Sandford: Part of your paper is an exposition of differences between marginal private and social costs and benefits in using rangelands; your argument has come to be known as the tragedy-of-the-commons argument. Like many economic models, it is a highly formalized model that deduces how people will behave from what are assumed to be their objectives. Such formal models are useful analytic tools, but as they are based not on observations of behaviour, but on assumptions, they must be tested against actual behaviour. The tragedy-of-the-commons argument rests on five or six linked hypotheses. Several of these hypotheses do not in fact correspond to how people actually behave; people should, therefore, cease to use the argument as a policy guideline.

Hopcraft: I believe a thorough analysis would show the common-property argument to be well founded, theoretically and empirically. It was first formulated nearly 2 centuries ago in relation to communal grazing rights in England; communal grazing in pastoral societies is a case also in which theory and evidence converge. Human societies, including pastoral ones, have sought answers to problems created by common-property rights; my paper has attempted a contribution to that process.

Ssennyonga: The author looks at pastoralists as members of a closed system with scarce resources and does not consider their relationship with neighbours and adjacent resources. We need to establish our boundaries of analysis. The actions of a member of a community as an individual differ from those he or she takes in concert with other members vis-à-vis another community — when stealing cattle for instance. Each productive system has strategies of trading off its costs, or failures, with its neighbours. The pastoralists have been denied these strategies, but they bear the costs of agriculturalists, whose exploding population has encroached on pastoral land. This is where the analyst crosses the boundary between economics and politics.

Willby: Hopcraft's paper lays the situation firmly on the line. The primary resource is the cows, and the primary product is the forage. Stock numbers and management must be dictated by forage availability. A major issue is how to relate individual stock management to the needs of the aggregate or, in my opinion, how to make up individuals into an acceptable aggregate (or
group) for management purposes. I believe that group ranches must come (in one form or another), and I welcomed Meadows' defence of the Maasai group ranches in Kajiado District. But I am horrified by his questioning the seriousness of overstocking of Kajiado, especially as that district was the most disastrously affected by the 1960–61 drought when the Maasai occupying it lost most (two-thirds we were later told) of their livestock.

Awogbade: At what level of production are group interests triggered, and at what level of production are individual interests triggered?

Hopcraft: The problem I have tried to pose is that individual herders, like the rest of us, behave in their own interests, as they see them. Who then represents the group interest? There is often no mechanism for imposing the group's interest on the individual and therefore on livestock grazing patterns.
consumption and marketing of pastoral products among the kal tamacheq in the niger bend, mali

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The Niger Bend, which derives its name from the turn the river takes in that region, extends from Goundam in the West to Ansongo in the East. The bend occurs in the northernmost part of the river as it flows through the Sahel, an area particularly well-suited for use as grazing land where 70% of Mali's livestock are raised.

In this part of the country, livestock are raised only by the Kal Tamacheq and the Fulani, who are in the majority in the central delta to the west. As in all pastoral communities, however, there are no boundaries between the territories of these two groups. This was confirmed during the most recent droughts, when a large number of Kal Tamacheq herders changed their location.

The Kal Tamacheq occupy northern and western Mali. They share this region with the sedentary Songhai, settled in large numbers on the riverbanks, who use dry farming methods to grow rice and sorghum. The Kal Tamacheq, known by their Arabian name as the Tuareg, originally come from the Sahara. They are fair-skinned and moved into their present location as a result of increasingly dry conditions in the desert. In the past, these fierce fighters raided villages in the Niger valley and enslaved sedentary groups such as the Eklan and Bella, who are now free but have adopted the language and lifestyle of their former masters. The Tuareg economy was traditionally based on these slaves, who worked as shepherds, servants, and even, in the lake region, as associates. In spite of their independence, some of these people remained with, or followed, their former masters, whom they still respect and obey. Industrious, brave, and above all, hardy travelers, the Kal Tamacheq have built up large herds that enable them to be completely self-sufficient.

Regional ecological conditions are typically Sahelian: annual rainfall is between 350 and 200 mm, and the rainy season lasts from July until October. Annual plants predominate, and the soils are sandy, poor, and fragile. Variations from one year to the next are considerable, and droughts are frequent. Rainfall began to decrease gradually in 1968 and reached a

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1 This paper was submitted but not presented at the meeting; it was originally French and was translated into English by IDRC for inclusion in these proceedings.
minimum during the great drought of 1973. Losses in livestock, as well as in human lives, were enormous: an estimated 60–80% of the herds died. Precipitation has remained below average since.

As a result of such poor ecological conditions, Tuareg herders are constantly in search of grazing lands and water. Their tent dwellings made of cured hides are simple to move to the best pasture areas. During the dry season their migratory movement on both sides of the Niger is toward the river, due to the presence of water and bourgou (*Echinochloa stagnina*), a grass that provides good forage and is preferred by the cattle. Also, large numbers of livestock gather around the wells and permanent pools, the largest of which has spread over 9000 ha. Most wells are located in Haoussa, on the right bank, where there is a chain of permanent and semipermanent pools.

Nomadism is practiced on a small scale in this region, where the distances covered rarely exceed 200 km. Since the early years of colonization, migrations have been reduced as the result of a pastoral water supply policy, but the groundwaters were known and used to best advantage even before colonization. Thus, the nomads drill artesian wells 3–6 m deep on the banks of the pools. Because of their number — several dozen around one pool — and the considerable volume of the water table, these wells play a vital role in the lives of the nomads. Most Tuareg herders even prefer to remain in the vicinity of the wells, artesian wells, and permanent pools. They are unwilling to take their cattle down to the river because they wish to maintain independence, and, especially, to protect their stock from disease symptoms such as diarrhea and fever. They have learned from experience that the river transmits diseases except during the high water periods.

The herders live close to their animals, which are a source of meat for feast days, leather, skins for domestic uses, and milk. They sell stock more readily than do the Fulani but less willingly than do the Moors. Selling livestock is their only commercial activity. It is a socioeconomic necessity, a sign of prosperity and distinction. In fact, livestock play an important role as tax payments, as gifts, and in the purchase of clothing and grains. Many families reckon their wealth by the size of their herd.

The Kai Tamacheq of the Niger Bend raise mainly horned cattle, sheep, goats, and camels. The bovine breeds are Tuaregs and Moors, and the sheep and goats are tall, thin Sahelian breeds. The camels are also tall, but unlike those owned by the Tuareg in the Sahara — for whom camel's milk is the dietary mainstay — they are used primarily as a means of transportation.

**milk and milk by-products**

Among the breeds raised, Tuareg Zebus are by far the most numerous, followed by Moors and Fulani-Moors. Many of the animals are crossbred. Moors and Tuareg Zebus are preferred because their milk yield is superior to that of the Fulani Zebus.

Milk production and consumption differ in the dry and rainy seasons. During the rainy, or wintering, season, calving begins (May–June), and milk production reaches its maximum: cows produce 2–5 litres/day and sheep 0.7–1.21 litres. Goat's milk is plentiful all year, but the yield increases between November and January during the cold, dry season. This milk is used primarily for domestic consumption; drunk fresh in the evening and
curdled during the day, it is the mainstay of the family diet. The richest herders care for their relatives and the poor. Milking is done twice daily. Considerable quantities are consumed by the women and girls. In fact, the Tuareg herders’ status depends not only on the number of cattle (especially bovines) they own but also on the size of the women in a family, fat women and girls being a sign of prosperity. During the dry season, milk is consumed only by the women and children. The rainy season is the period of abundance but also of waste: among the rich herders a certain amount of curdled milk is simply thrown away.

During the dry season, the milk yield drops dramatically because of the lack of pasturage and water. However, where possible, some animals are kept on undamaged bourgou fields and islands to ensure a good supply. Among the small ruminants, only the goats are milked. Sheep are not milked, as they are almost all with young or are not lactating. Sometimes she-camels are part of the stock, and they yield 6–10 litres of milk a day.

Butter is made in a calabash or wooden basin; a goatskin is agitated in sour milk until the butter “turns.” It is then boiled and is ready to be preserved for special occasions such as religious holidays, weddings, baptisms, or visits from strangers.

During the dry season, butter is made only by shepherds, who constitute a quarter of the pastoralists in Gourma. Butter eaten during this period comes from the herders’ reserves or is purchased either from shepherds or at markets.

Stocking of butter and cheese begins at the onset of the wintering period. The major producers of these by-products are shepherds, because herd owners allow them to keep a portion of the milk yield as salary. Thus, they are often the only ones to have enough milk to produce butter during the dry season. The income they derive from this is frequently used to build up their own herds of small ruminants, which supply their daily needs. The cheese, for its part, has an indirect economic effect on trade. Made with surplus milk, it is given in return for food and lodging when nomads visit towns to make purchases.

The sale of milk and its by-products is an activity reserved almost exclusively for shepherds and certain former slaves who establish “milk belts” around urban centres, especially while herds are wintering. Sour milk and butter are sold because they are easy to preserve. Very little cheese is sold. During the dry season cheese is not sold, and milk is very rarely found on the markets. The exchange of milk for grains and other goods is extremely rare. In fact, such bartering can only be done in areas where producers and consumers live close to each other, as on the riverbanks and near lakes.

**skins, hides, and meat**

The remains of animals slaughtered for food, or dead from injuries or epizootic and parasitic diseases, are used for producing sheepskins and goatskins employed in making such varied objects as saddlery, ropes, vessels for drawing water, shoes, cushions, and ornaments. Most skins, however, are used to make tents and their furnishings, such as cushions, bedding ornaments, sacks for storing grains, and goatskin water bottles. Because of inadequate tanning, all these objects wear out or fall apart very quickly and must be replaced frequently. As a result, very large quantities of animal skins
are consumed. Sheepskins and goatskins are used for tents and various domestic purposes, whereas cowhides are employed for ropes and shoes. Herders have no interest in marketing hides and hesitate to go long distances to sell them because their commercial value is minimal. The hides are badly stripped, are nicked during scraping, have holes and brand marks, and, in most cases, have been dried in the sun. If well cared for and well treated, however, they are of good quality.

Cattle, usually small animals, are slaughtered for visits from relatives or strangers, Moslem religious holidays, dietary needs, and need for hides used in handicrafts. In the selection of animals for slaughter, the herd owners attempt to preserve the stock's reproductive potential and to slaughter animals that will have the least commercial value.

The determining factors in the slaughter, other than fatal illness among the animals, are the owners' level of wealth and the number of their dependants. Slaughterings are rare, and cows who are to be culled are generally used. For weddings or receptions, however, rich herd owners slaughter adult bulls.

In a survey of herd owners in Gourma in 1979, reasons cited (more than one reason was sought) for slaughtering cattle were visits from relatives or strangers; hospitality (74%); sickness or imminent death of animals the meat of which is still edible (63%); Moslem religious holidays (47%); dietary needs (37%); treatment of sickness in family (11%); and need for hides used in crafts: tents, ropes, sacks; wedding ceremonies (negligible percentage).

Of the herd owners surveyed, 75% were Kal Tamacheq — a fact that explains why hospitality was the reason most frequently invoked for slaughtering cattle. Fulani and Songhai herd owners slaughter fewer animals for this reason. Also, the fact that some herd owners kill animals for their hides and skins shows the importance of leather crafts in this region.

In herds of small ruminants, goats are slaughtered in slightly greater numbers than sheep, and herd owners traditionally consider goats the least important members of the herd. Lambs are slaughtered for reasons of prestige when they are needed for hospitality or religious holidays. Adult animals are slaughtered much more frequently than the young, which do not provide a sufficient quantity of meat. Culled 6–8-year-old females among the small ruminants are slaughtered in preference to male adults, which have greater market value.

Meat consumption is especially high at the end of the rainy season for two reasons: the animals are fat; and goatskin bottles must be made in preparation for the coming dry season. Each family slaughters from two to four goats, the cured skins of which will be used to hold water throughout the dry season. The meat is shared among the various tent chiefs. Animals may be offered as sacrifices for ancestors, "to give the ancestors a drink."

Kal Tamacheq herd owners sell cattle to obtain the money required for purchasing grains, clothing, and other consumer goods. They must go to regional markets or even travel long distances to make such purchases.

marketing livestock

Marketing cattle involves putting animals on the hoof up for sale on regional or foreign markets. Animals are classified while still young. Females are kept for breeding purposes, whereas among males a choice must be
made. The best are kept as sires, but most are castrated. Direct castration is most frequently used, and castration by closing off the vas deferens is used only on sires that will be culled.

Cash outlays are very high during the dry season. Cattle are sold to meet immediate needs but in a strictly limited fashion. All categories of animals are sold for the following reasons in order of importance: dietary needs (purchase of grains, tea, and sugar); family clothing; taxes and dues; purchase of female animals for the rebuilding of herds; and labour for artesian wells. The herders’ desire to rebuild their herds must be emphasized. Some sell old cows in order to buy heifers. Others sell bullocks and export bulls and bull calves, to solve urgent problems, first of all, and then, with the remainder of their earnings to buy sheep and goats. Because the small animals reproduce more quickly, herders can later sell the males to pay for the larger cattle.

The choice of the animal or animals to be sold depends on the herder’s needs. According to 1978 figures for the Gossi market, the types offered for sale are by order of importance: sheep; goats; adult bulls and bullocks; and heifers. The large number of sheep sold is explained by the fact that they are exported to Algeria via Gao. The small ruminants are mainly male adults, most of them rams. They are sold so that young sheep or goats may be purchased and immediate needs met. The traditional marketing system is used in weekly fairs. Such fairs or community markets are numerous, and their size varies according to the seasons, their geographical locations, and the number of participants. Herders choose markets for their good prices; sales opportunities; and proximity.

Herd owners take the animals they have for sale to market themselves. The camp site may be located dozens of kilometres away, and, occasionally, when they are unable to go, they give the task to their sons, shepherds, and trusted associates.

Sales prices cover the costs of the trip to the market, overnight lodgings, market entrance fees, police fees, watering, and the river crossing. Costs for making the trip with the animals depend on the distance of camp sites from markets. These costs are expressed in a lump sum determined by the herd owners. Other costs that cannot be quantified, such as that of the shepherds’ food, are also covered. At the market, herd owners use the services of brokers who conduct sales for them and receive a percentage from the purchasers or owners.

After colonization, the Niger Bend, a major livestock-producing area, supplied the markets of Algeria and the Gold Coast — or, as it is known among the Kal Tamacheq for its main market, Kumasi. Sheep bought at various regional markets were herded from Gao to Algeria, then transported by truck. Herds containing several hundred cattle were driven to the Coast, a mirage for all herd owners.

After independence, however, exports were also sent to such coastal countries as Nigeria and the Ivory Coast. Niger and Upper Volta, which had livestock surpluses, were merely countries to be crossed on the way.

Since 1974, the herds have recovered their former size, and livestock trade has recommenced. As a result of the herd renewal policy, herd owners have been less willing to sell than they were; many former herd owners have abandoned the trade; and those who remain have diversified their activities.

Ghana, because of its financial difficulties, has ceased to be the major cattle export market for the Niger Bend since approximately 1976. Other
markets, such as the Ivory Coast and Nigeria, have been established, and some herds are sent to Benin and Togo from Nigeria. 

Goats are consumed on a purely local and regional scale. Only a few are traded across the borders of Upper Volta and Niger. Sheep, on the other hand, are the object of a distinct and active commerce with Algeria. Exports were stopped in 1976 but began again in 1978. Sheep are gathered in the many regional markets then herded to Gao. Further transport is by truck because of the lack of forage and water.

Importers buy Mali cattle for their meat. Within a given breed or species, castrated males always provide the best quality meat.

problems and perspectives

The most crucial problems involve the stabilization of prices for pastoral products, especially at the regional level and on export markets. As raising of livestock is the sole commercial activity of the Kal Tamacheq, it is important that they derive the greatest possible profit from it. As long as trade remains disorganized, as it is at present, herders will be at the mercy of speculators. Today, most of their income is derived solely from their stock on the hoof. It is important, therefore, that herders be aware that pastoral by-products, especially butter, cheese, and skins, also constitute a major source of income. These products must be mobilized and traded intensively. Ensuring their consumption during the 9 months of the dry season is the problem now facing the herders. Herders’ cooperatives created during the years immediately following independence did not encourage their members to intensify the development of their herds, because the role of the cooperatives was limited to that of supplying grains, tea, sugar, and cloth. The activities of these cooperatives should be diversified. If herd owners were assured that the cooperatives would make the greatest possible profit from herds, they would likely sell their products to the cooperatives. Also they could rationalize their milk production and place much more emphasis on butter and cheese, now considered “emergency products.” Herd owners desire a kind of bartering system for the exchange of pastoral products against grains, although on a monetary basis. In their present form, however, cooperatives are beset with problems, for they lack both funds and grains.

Hides and skins need to receive particular emphasis. They are in great demand in domestic markets such as Sombrepec and Tamali, as well as in foreign markets, but at present are badly stripped and scraped, have holes, and carry brands. In most cases they have been dried in the sun. Like the other products, hides and skins should be sold to the cooperatives.

The most important problems are found in the export trade, especially with regard to cattle on the hoof. They suffer enormous weight losses during drives — often 25% of their total weight — and there are rarely as many animals at destinations as there were at points of departure. The reasons are:

- Bad selection of animals; cows and bulls less than 4 years old have great difficulty withstanding the rigours of the drive;
- Great distances covered;
- Large size of herds, which leads to major difficulties in finding sufficient water; water holes are too few, badly distributed, and often dry from March until June;
• Widespread presence of poisonous plants in the coastal countries; the animals are unfamiliar with these types of forage and are hungry;
• Wild beasts such as lions and hyenas;
• River crossings; and
• Administrative "red tape," which discourages many traders.
women and pastoral development: some research priorities for the social sciences

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We are making a plea for researchers in the 1980s to focus some attention on the position of women in pastoral societies. At present, there is little known about their contributions or the ways in which they shape development. Many theories have been advanced to suggest that this is a natural result of women's biological and social reproductive function. Women are seen as victims of their bodies: child-bearing, breast-feeding, and child-rearing automatically excluding them from viable political and economic participation. It is our contention that women do not occupy this position because of intrinsic biological factors. A consideration of the organization of labour, and of who controls the system of exchange, will reveal the ideological and power structure of the society, which results in women's subservient economic position and status. Discovering how labour is divided by sex and age and how the division of labour relates to the internal social and political organization of society is perhaps a first step toward a well-rounded view. It is needed not only for itself but also for its use by individuals trying to assess the impact of changing access to productive resources stemming from internal and external forces. Commercialization of the economy, sedentarization, and introduction of new economic opportunities and activities, such as wage labour and agricultural production, all imply substantial changes within the pastoral social system and, in particular, in the opportunities and resulting role and status of women.

We acknowledge that all consideration of social process should take account of the social and technical division of labour and in fact encompass all levels of social interaction. Women's situation is part of an age and sexual differentiation. Men also are not equal within societies; however, their access to power and influence varies in relation to different stages in the development cycle of the household and the wider society.

Participants in this conference are mainly addressing the problems facing pastoral groups in terms of economic viability and herd size and structure. As social scientists, we feel that our concern should be mainly with people and their interaction with their resources and that research priorities for the 1980s must be to examine the theoretical level of social change in relation to planning and development. Development policymaking should be based on a total picture of pastoral society, with an understanding of the relationships, activities, and attitudes mediated by sex and age.
One of the major research priorities is to find a valid definition of the concept of "household unit." In traditional settings it is likely that the boundaries of the household network will be far-reaching, and the consumption unit may well extend beyond the boundaries of the production unit. Change in production methods will probably alter this relationship. Research priorities should be to analyze the impact of socioeconomic change within the household in addition to the usual focus between households. Patterns of management can be observed at the level of the household unit where it operates as a corporate group. However, the externally corporate character of the household units should not lead one to overlook the internal contradictions based on sex.

It is evident that, in agricultural and pastoral societies in Africa, men and women often engage in different productive activities that form the basis for separate sources of income, different support obligations within the household, and different decision-making roles. There are numerous examples that socioeconomic change and ecological stress do not affect male and female household members in the same manner. Likewise, the adoption of technical change and participation in government programs designed to improve welfare have in many cases had a different impact on different household members.

In the past, women’s roles have been neglected by development planners and social science researchers. With the exception of Horowitz’s comments, women were not mentioned at this conference until a special request was made. This has serious implications for research priorities on pastoral peoples as well as the information base for development planning. In almost every development project, men have been the target group. It has been taken for granted that men are the providers for the household. Consequently, access to new productive resources and activities like cash-crop production and skilled wage labour has often excluded women. The critical role of women in the household economy is neglected. The problem in much former research has been that women have been considered as passive participants in their social world. This bias has at least partly been a reflection of researchers’ being preoccupied with the formal power structure of pastoral societies, which implies male control of family and economic activities through decision-making. Yet, there are important areas of decision-making for women as well as ways they have of influencing male decisions.

Many social anthropologists have shown the importance of considering the wider sets of constraints and incentives that channel individual choices. To assess women’s influence in a society, one must look at more than moral injunctions or jural rules, both of which stress the woman’s duty to obey her male relatives. Women’s courses of action appear intelligible only if women are seen as actors, whose strategies are channeled by cultural values, resources, and choices available in the social system. As new resources enter the arena, both men and women seek advantage from the new opportunities, and the course of social change reflects the complex interplay of male and female tactics as well as the differential options meted out by change agencies.

In other words, an analysis of pastoral society should take into account women’s roles as members of a production and household unit; in the kinship system as members of a family and lineage; and in marriage as members of inheritance structures. It should also look into their labour input;
their position in decision-making; their investment in the market system as traders and buyers; and their potential investment in the livestock trade. A possible analytic tool might be to distinguish between the domestic and public spheres of interaction. Therefore, we suggest that research priorities should be to examine carefully:

- Differential access to productive resources/property relations;
- Division of labour by sex and age;
- Support obligations and sources of income of different family members;
- Decision-making within the household; and
- Cultural-cognitive categories.

Each of these categories should provide a wealth of information about pastoral society and should be examined from the viewpoint of how it is affected by socioeconomic change. Examination should not be restricted to a linear analysis but should take into account the history, as well as the place of the social system within a wider ethnic and national context. The influence of local and national governments, as well as neighbouring groups, in the evolution of a society cannot be ignored in an analysis of socioeconomic change.

**access to productive resources**

In the pastoral setting where land is communal, ownership of livestock, as the key productive resource, is especially worthy of investigation. The issue of rights to livestock within the family is complex. A misconception—prominent in the thinking of development planners—is that cattle are solely controlled by men, although women may possibly have special rights to sheep and goats. In fact, animals are often allocated to individuals within the family but herded as a group. We believe that if so-called ownership or control were examined in more precise terms, a somewhat more complex picture would emerge, showing that women have certain rights over livestock. Ownership or control could be divided into:

- Herding rights;
- Alienation or disposal rights; for example, in many pastoral groups in East and West Africa, consent of the wife or son is often required when the head of the herd wants to dispose of one of their animals;
- Rights to use the milk and other produce; and
- Inheritance rights.

In some societies, women do the milking and the processing and have a right to sell milk or use it as butter for sale. In some pastoral societies, women are also allocated cattle at the time of their marriage and on the marriage of close kin. Although a young woman may have only milk rights in an animal, older women actually own the cattle.

The importance of this issue can be seen from example. After the herds of the Fulani and Tuareg of the West African Sahel were decimated by drought, a government/international donor agency project was undertaken to assist in restocking the herds. It was assumed that the men were the owners of all the cattle, and they were given the rights to the new animals. Although the men were able to replace their cattle, the women (who had rights to a certain portion of the original herd) complained that their cattle were not replaced.
Land is the other key resource. In the traditional setting it is usually communally held. With the process of commercialization of the economy, privatization of property (and resources), and increasing land constraints, the relationship of pastoralists to this resource is extremely important.

division of labour

Comparative studies are needed that explicitly delineate the activities undertaken by men, women, and children among both pastoralists and agriculturalists. It would also be useful to know the relative amount of time spent by each in these activities. This might indicate the feasibility of introducing income- or produce-generating activities as well as telling something about the relative work burden of men and women. Possibly most important, it would provide a more complete framework for analyzing the effects of government policy, sedentarization, and the incorporation of agricultural activities into the pastoral economy.

Although the economic factors are important, understanding them is necessary but not sufficient to understanding change. It is essential to examine the entire cultural and social matrix.

support obligations, sources of income, and decision-making of different household members

To understand the implications of socioeconomic change in the pastoral sector, including the interaction with the encompassing society, one needs to know more about obligations to provide goods and services to the household. What is the relative contribution of men and women to the food supply? As production begins to generate cash, how do the husband and wife allocate their income? Is it possible that men may use surpluses to save for restocking and women use their income solely for food and household maintenance? And, very importantly, what implications does the possible transition from milk to beef production, which seems to be strongly advocated by development planners, have for men’s and women’s access to capital, income, and social status?

Earlier in this paper, we briefly discussed the importance of a consideration of the decision-making roles of women in pastoral society. We want to stress that women do play an active role in decision-making in both the domestic and the public spheres. This can be neglected by researchers if they concentrate only on the male head of the household or formal structures.

cultural—cognitive factors

Each society has its own cultural definition of sexual differentiation. Differently conceived expectations of what constitutes femininity and masculinity are mediated through cognitive categories. The sex roles in the society can be regarded as an organizational device generated by a specific set of cultural values and preferences as well as ecological, economic, and technological factors. Therefore, the specific form of any social system cannot be understood solely in terms of adaptation to the productive system.
summary and conclusions

In summary, we feel that there is a need to develop a well-rounded view of pastoral society and to ensure that the study of social change is a study of people — men, women, and children — and not just abstract units, such as households. It has been suggested that economic development — in particular changes from one production system to another — often leads to a situation where women lose power and status. They find that their traditional fields of control do not have the same significance in the new context. For instance, case studies have shown that the transition from subsistence agriculture to the production of cash crops for an external market has adversely affected women's position. The findings were that men accrued the benefits of cash-crop production, whereas women's work burden increased and they became marginal producers in the increasingly important market economy. Such studies have led scholars to generalize that economic development per se has adversely affected women; another possible interpretation is that development policy is the underlying problem because it concentrates on men as cash earners and decision-makers and fails to view women as participants.

Some encouraging results have come from recent studies in pastoral settings in Kenya — for the Somali, Maasai, and Turkana. The findings seem to show that socioeconomic change has led to greater economic opportunities and control over resources and decision-making for these pastoral women. However, to conclude that pastoral women will gain more by development than agricultural women is too simple, as are any generalizations that ignore the great diversity of social — cultural systems, environmental conditions, and the nature of new economic possibilities (e.g., scale of production, type of technology, etc.) and how they are introduced or evolve.

We recommend that researchers try to construct a model, an analytical framework that can identify the crucial set of variables defining women's status and potential under divergent and changing conditions. We have identified some critical factors for study, and we hope that social scientists will take them up in a search for a more valid understanding of the trends of cultural and socioeconomic change so that they can clarify the emerging patterns of social organization.

discussion

Horowitz: The fallacious assumption in many projects is that their impact on women and children is irrelevant. We need to anticipate in development the implications of projects for all sectors of society so that we don't later realize that effects on women, for instance, are disastrous. Our information on female functions is inadequate, in part because of constraints on the gathering of data. A profound difference exists between women who are employed outside the home and those who are not, and such tendencies are exaggerated through change. In the Sudan, the anthropologist Muneera Salem-Murdock is conducting research on the impact of sedentarization of Arabic-speaking pastoral women on the New Halfa Agricultural Scheme. She is especially concerned with how the scheme leads to increased social differentiation — with some households able to mobilize capital and labour, expanding their control, and other households being forced into an agrarian
proletariat. Women from the lowest classes appear to be entering the wage labour market. This study, part of the Institute for Development Anthropology's comparative study of agricultural potential of new lands settlement, will continue in the field until January 1982.

**Khogali:** There is a sharp difference between the domestic economy and production processes of the Beja (Red Sea region) and the Shukriya (Butana region) women, on the one hand, and the women in Western Sudan, on the other hand, both nomadic and settled. Women in Western Sudan do much and, in some cases most, of the work of production. Besides cultivating and herding, many women work as hired labourers in construction. On the other hand, the Beja and Shukriya women do not take part in production, and they are not allowed to do certain work, such as milking the animals, that we consider domestic. Among the Tuareg, women have greater access to means of production but are still dominated by men, so their role in production is not valued. In war and trade, men appear dominant.

I have the impression that the speaker wants to see women as actors and decision-makers. Why? Taking part in production and decision-making does not necessarily liberate women. In the nomadic and settled populations of the Western Sudan, women do much work related to production; in fact, in parts of the Nuba hills, women do most if not all the cultivation. Yet they are not liberated. We should address ourselves to this predicament.

**Broch-Due:** When studying men's activities, no one asks whether they are "liberated." The questioner asks why we want to see women as actors. We respond that women are, by virtue of being human, actors and decision-makers. What we are interested in, as with studies of the male side of the society, is what relation they have with the general social, hierarchical, and production aspects of the social system. Then we can analyze how changes that are introduced will influence their positions, strategies, and choices.

**Salzman:** In addition to changes for women brought about by changes in productive and exchange activities, there are also those brought about by changes in the administrative structure resulting from encapsulation of the local population by the state and by increased state intervention. Women may have little access to the administrative apparatus and little influence in decision-making. There may be a loss in control compared with previous times when decisions and administration were controlled by local groups.

Services provided by the government may also affect men and women differently. Education is a channel of mobility, and if women have less access to it than men, they will be disadvantaged accordingly. Similarly, medical services may be more available to men than women — for example among Muslims the modesty code prevents male practitioners from contact with unrelated women.

**Ssennyonga:** This suggested program on the role of women in pastoral societies neglects their reproductive role, which — as pastoral societies are noted for their low population densities and rates of reproduction — is very significant. We need to know more about reproduction. Indeed, the conference has dwelt on pastoral production to the neglect of reproduction, I suggest women will find it easier to study reproduction among pastoral groups. In Kenya, for example, among the Kalenjini, there are matters (such as female circumcision) from which even native males are excluded.
Sandford: Governments and their officials are just as much actors in the pastoral sector as are pastoralists and cultivators. They equally merit anthropological study if we are to understand better their interaction with pastoralists. We need, for example, to study the life cycles of officials in pastoral areas to understand why they behave the way they do. The problems of providing services (such as health) to pastoral women would particularly be alleviated by such a study of the lives of women officials. Apart from a paper by Robert Chambers ("Administrators — a neglected factor in pastoral development") and Anders Hjort's Savannah Town, little has been done in this area so far.

van Drunen: Better health care for nomadic women needs more than simply the replacement of male doctors by female doctors. Remoteness from health services in simple emergencies that arise from delivery and pregnancy subjects nomadic women of childbearing age to risks much greater than those that settled women experience. Health care has to be adapted to that kind of need; it may also require a greater degree of stabilization for the women.

Child spacing and birth control are not easily organized. In Somalia, with shorter breast-feeding periods, partly due to anemia, and because of shorter terms of pregnancy, also due to anemia, it is not unusual to see 8-month gaps between babies. At the worst, there is a relation between poverty, poor diet, anemia, less breast-milk, and more-quickly fertile women but less healthy placenta. These problems, like all so-called female or male problems, need the cooperation and understanding of both sexes.

Broch-Due: Studies indicate that health among pastoral people is in fact better than among settled people. Settlement can in fact exacerbate health problems through undesirable changes in diet, infection due to proximity, and the psychologic stress of a new lifestyle. Health workers have found that children in the nomadic setting have a better life expectancy than do their settled neighbours. This situation can of course be upset by severe drought.

Conant: Women's reproductive role should be a priority research goal in the 1980s. The literature on tropical medicine indicates that women have as high mortality in childbirth as men do in raiding. Women in some East African pastoral societies attempt to increase the interval between births by prolonging lactation and enforcing the postpartum taboo on intercourse. These strategies need further study.

Saleman: Having seen young women in the herding camp where I lived in Baluchistan die unnecessarily from childbirth complications (although medical services were available in the administrative centre), I can attest to the misfortune that can result from reproduction in nomadic herding camps. But to suggest, as has just been done, that women have no control over their own reproduction and that all difficulties flow from men's lack of concern gravely distorts reality. Women's own priorities and commitments, especially with regard to having children, are crucial elements of the system. Men and women share a common culture, and women participate in it and believe in it, even though it may have costs for them.
recent changes in bedouin systems of livestock production in the syrian steppe

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About 50% of Syria is covered by a zone called the steppe, which receives less than 200 mm annual rainfall. This zone is inhabited by Bedouin sheep owners who lead a nomadic way of life. Although the Bedouin represent only a small part of the total population, they occupy a vital position in the agriculture of Syria.

During the last 30 years, this system of sheep production has been suffering from the decay of its very foundation, the steppe, which provides winter and spring grazing for the sheep. Much of this decay, also seen in other countries of the region, has been caused by an increase in sheep numbers on an area reduced by the encroachment of agriculture. During the last 20 years, policies have been introduced to halt the exhaustion of the land before the damage becomes irreversible.

Thirty years ago Bedouin communities could be found throughout the steppe in southeast Syria. Since then the total population has declined, in marked contrast to the increase in the total population of the country. Whereas in 1952 the Bedouin represented 8.1% of the total population, by 1978 they represented only 3.2%. Furthermore, the annual average rate of growth of the total population between 1970 and 1978 was 3.5% compared with a very low birth rate among the Bedouin.

the bedouin way of life in syria

Most of the Syrian steppe is characterized by rangelands not fit for sedentary agriculture due to the low rainfall. The rains generally fall between October and April with a peak between December and February. The area is further characterized by large fluctuations in rainfall between one year and another and even within the same season. Such fluctuations affect plant growth and, consequently, the inhabitants of the steppe and their livestock.

The climate is arid, with large seasonal variations in temperatures that drop below 0°C in winter and rise to 48°C in summer. The dry period lasts more than 6 months during which the relative humidity does not exceed 35%.

Many palatable plants used to grow on the plains of the steppe. The most important were *Salsola vermiculata*, *Stipa* spp., *Artemisia herba-alba* as well as other perennial and annual grasses and legumes. Trees such as
Pistacia atlantica and Rhamnus palestina also grew in the mountainous parts. Wildlife was also very rich. In particular, large herds of gazelle used to wander throughout the steppe. In winter, tents made of goat hair protected the Bedouin from the cold and rain. In summer, these tents were replaced by those made of hemp or cotton. Transport was by camel. Sheep were a major source of food, and other needs were financed by the sale of surplus animal products. The main staples were animal products such as boiled butter (ghee), dried yoghurt, to which crushed wheat was added, bread made with a mixture of wheat, barley, and sorghum flour, grape molasses, and dates. Meat was only eaten on special occasions such as weddings or during visits of important guests.

There used to be a close relationship between the Bedouin and the merchants in the cities and towns. Products would be sold through dealers in towns where food and clothing were purchased. To obtain cash, more than 50% of the Bedouin had arrangements with merchants or financiers in towns. There were different types of arrangements, although el-Addem was common. In this arrangement, the financier provided capital for buying the sheep and paid other expenditures such as taxes, water, and feed. The Bedouin took care of the sheep. At the end of the season, sheep, lambs, wool, and ghee were sold, the proceeds of which went to the financier until all expenses were paid. At this point the remaining capital was equally divided between the partners. This arrangement, which sometimes continued for 3–5 years, still exists but is now much less common. Studies carried out by the International Center for Agricultural Research in the Dry Areas (ICARDA) in 1979 showed that 12.5% of the members of cooperatives had share arrangements; this number represents 8% of the total sheep owned.

Spinning wool and goat’s hair was the responsibility of women who also made rugs, tents, and sacks to meet their requirements for bedding and flooring. Surplus thread was sold to merchants. Some of the women also made embroidery for home use. If they were close to towns, Bedouin processed enough ghee, cheese, and yoghurt to sell as well as to meet their consumption needs. Schools were not available in the steppe, and the majority of Bedouin have remained illiterate. The Bedouin lifestyle was characterized by a system of movements called “east and west trips.” The sheep migrated in late October east and southeast from cultivated lands into the steppe, following the first rainfall. The sheep grazed on shrubs and dry plant residues. Water was available from wells or collected from rain. During this period lambing began and continued till mid-February. Supplementary feeding was not known or practiced, the sheep and camels being completely dependent on grazing to meet their feed requirements. By mid-May, the Bedouin started returning northwest and southwest to cultivated areas where the weather was cooler and water was available. From June until November the sheep and camels remained in these areas and grazed on the stubble. In summer while they were in the cultivated areas, the Bedouin sold their lambs, wool, and milk products and bought food and clothing. They continued this practice till October–November, then migrated back to the steppe. This pattern was found during average and good years, but in dry years the Bedouin penetrated further into the coastal area and northeastern Syria.

Sheep raising was the only agricultural activity in the Syrian steppe and the livelihood of many people. In 1953 the total number of sheep in Syria did
not exceed 3 million — an estimated 75% owned by Bedouin. Between 1958 and 1960 a severe drought reduced the number of sheep from 5.9 million to 3.5 million. It was a disaster that forced many Bedouin to migrate to other rural and urban areas in search of employment.

When the tribal system was still important among the Bedouin, problems were handled by the chief of the tribe in accordance with tribal law. This law was issued by the authorities to regulate the relationships between the Bedouin and the government and between the Bedouin themselves. A special police force, "the guards of the badiya," was established to maintain law and order among the various tribes. In 1960, the tribal law was abandoned, and the civil law became applicable to all citizens. Several changes have occurred during the last 30 years, and these have affected the relationships between the Bedouin and the land and Bedouin and their environment. For instance, in the late 1940s and early 1950s the life of the Bedouin was affected by the introduction of farm machinery. Marginal land was brought under cultivation, and tribal chiefs contracted farmers and tractor owners to till the marginal land that had been traditionally used for grazing. Cultivated areas started to spread rapidly in all directions at the expense of the steppe. The only people who reaped the benefits of the new equipment were the tribal chiefs and their partners, the farmers. Consequently, many Bedouins left livestock breeding and turned to work in settled agriculture.

In accordance with Land Reform Law 161 of 1958, lands in all cultivated areas of the steppe were distributed among the Bedouin who had become farmers. The law discriminated against the tribal chiefs who had owned most of the cultivated lands. They lost their estates, and many left the country. This change shook the tribal system and modified many of its social features. The Bedouin began to live in the marginal and cultivated areas of the steppe in settlements that acquired the character of administrative units. They started to cultivate their newly acquired lands in partnership with tractor-owning farmers. But as the annual average rainfall does not, at best, exceed 250 mm, crop production has often been limited and irregular. In dry years, it was not worth harvesting crops, and the cultivated lands were left for the sheep to graze. Because of the drought that has extended over the past 15 years, many of the new settlers have abandoned their land and turned to work in the city.

In 1979, ICARDA began a study of eight families that live in four villages in the marginal area between the steppe and the cultivated zone. Of these, only four families were left at the end of the year. The other four sold their sheep and migrated to Aleppo in search of work, their agricultural production being too scanty to satisfy their basic needs.

In 1966, the Euphrates Dam project was started, and it absorbed many of the steppe dwellers. The second stage of this project, involving the development of new agricultural areas, continues to absorb the Bedouin, who are settling in the project villages and have begun a new life as farmers.

In addition, the great demand for labourers in oil-producing countries, especially Saudi Arabia and the Gulf states, has attracted many Bedouin. Many were encouraged by the fact that they had tribal roots in Saudi Arabia.

For these reasons and because of ecological changes in the steppe’s plant, livestock, and wildlife, the way of life in the area has changed dramatically, even in customs, nutrition, transportation, and husbandry.
changes

Camels have been displaced by the car and tractor as a form of transportation in the steppe and have therefore almost disappeared. They numbered about 81,000 in 1953, 8,600 in 1978. The few remaining are owned by a few families of al-sba’a and al-Rowala tribes of the Syrian eastern steppe. They are raised for meat and live on the steppe throughout the year.

Some 30 years ago, plow cultivation of the virgin steppe began, following the introduction of the tractor. The northwestern and western areas were particularly affected, and some of the best grazing was removed. Subsequently, cultivation extended to depressions (Faydat) that are scattered throughout the steppe. These depressions used to ensure a large supply of fodder for animal feeding during drought. Today, very few depressions remain uncultivated, although successful crops are harvested only once every 4 years.

Most of the cultivated steppe is under a share-cropping system in which the tribespeople enter into partnership with merchants and farmers. Some Bedouin have begun to cultivate a belt of land around their grazing areas to serve as protection against neighbours who usually respect the cultivated belts and do not let their sheep graze on or inside them. It must be stressed that farming has failed in the steppe and marginal areas.

Transportation by cars and tractors has facilitated the quick movement of flocks in the steppe. Sheep owners are now able to search for good pastures and to move their livestock quickly to take advantage of them. Water is also transported to the grazing sites, in tanks pulled behind tractors or mounted on cars. Early grazing and overgrazing are common and are considerably accelerating the decline of the steppe. Moreover, transportation has made water available year round; some Bedouin remain in the steppe during the summer and increase the number of their flocks. All these changes have disrupted the long-standing transhumance and consequently have disturbed the plant ecology. Undesirable plants such as Noaea mucronata, Alhagi maurorum, Peganum harmala, Anabasis spp. have replaced the palatable species. In addition, considerable damage to the ecosystem is caused by trucks and tractors, which compact the soil and create dust wherever they are used.

The Bedouin use bushes in the steppe as a source of fuel for bread baking, cooking, and heating. They pull out the roots and leave the ground almost bare of arborescent shrubs. This practice contributes to range deterioration. I have estimated that bread baking for one family accounts for consumption of at least 15 roots a day. This represents a yearly consumption of about 5,375 roots pulled from 3 hectares of the best grazing land. This does not include the roots that are used for other cooking and heating.

Figures from the annual tax levied for each head of sheep indicated that numbers have been increasing. The total exceeded 7.2 million in 1978, which represented a steady rise from about 500,000 in 1973. The number of flocks has also increased. Herds vary from 50 to 2,000 ewes, the larger flocks being owned by the sheikhs of the tribes or by Bedouin in partnership with town merchants. A considerable shift away from partnerships has occurred so that today only 8% of the total livestock are still subject to the share arrangements (ICARDA 1980).

The Bedouin previously lived in tents throughout the year. This situation has changed. Of those who are engaged in dry-land farming, many members
now live in villages located in the marginal area or in nearby towns. Some of them work in neighbouring Arab countries.

In the steppe itself most of the Bedouin have constructed houses from stone and clay several kilometres from their neighbours. These houses are used as permanent dwellings and for storing animal feed. They still use the tents made of goat hair during their search for grazing. They usually return to their houses in November and stay there until the end of the winter during which they provide their sheep with supplementary feeding.

The Bedouin originally relied on natural range for all their feed supplies. During the drought in 1958–60, sheep owners began to provide their livestock with additional feed during the winter. They moved in summer to the higher rainfall cultivated areas for gleaning of harvested fields, which they rented at 25–50 Syrian lire per hectare. Today, when barley fails as a crop in drought years, fields are rented for grazing at 120–150 Syrian lire per hectare. As a result of range deterioration, decreasing fertility, and a reduced grazing area, the feeding of the livestock has become an annual necessity. I have noticed that during good years supplementary feeding of sheep has become essential during at least 3 months in winter. Following droughts, supplementary feed is given for at least 6 months in autumn and winter.

The disappearance of wild animals was caused by uncontrolled game hunting. Gazelle herds, which existed abundantly during the 1950s disappeared from the steppe. This slaughter continued despite an official act issued in 1970 that prohibited arbitrary shooting and delineated a hunting season.

Changes have also been observed in the diets of the Bedouin. Arab butter (ghee) is used less than previously and has been replaced by vegetable oils. Cheese has been introduced. Wheat has replaced barley and sorghum for bread production. The consumption of rice has also increased at the expense ofbourghol (crushed wheat). Also the purchases of vegetables and fruits have increased and, more particularly, potatoes, tomatoes, aubergines, green beans, which were formerly unknown among the Bedouin, are now common. Other recent introductions into the steppe are sugar and tea as basic foodstuffs. The annual consumption per person of these two products is about 50 kg and 3 kg, respectively. The sugar has replaced the grape molasses as a source of energy. But the consumption of meat has remained constant; meat is used on festive occasions or when a lamb or ewe is diseased or killed by accident.

Handicrafts are disappearing because the Bedouin are now relying upon ready-made articles from town markets such as tents, clothing, furnishings, and kitchen appliances.

government steppe improvement projects

During the past 20 years, the Syrian government with support from international aid agencies has actively embarked on a program designed to improve the steppe. Some progress is being made in rehabilitating, conserving, and developing the steppe and improving the living conditions of the Bedouin inhabitants.

Government experimental centres for range and sheep production have been established as demonstration and training units in range conservation and controlled grazing practices. In 1959, the Syrian government established
the Wadi el-Azib Range and Sheep Experimental Station, covering an area of 25,000 hectares. Another six centres were established in subsequent years covering 140,000 hectares in different parts of the steppe.

The specific objective of work aimed at developing water resources was to obtain water for the use of Bedouin and sheep in different areas of the steppe. One hundred and fifty storage wells were dug between 1930 and 1956 to store surface water; only 45 of these have been used; the rest have dried up.

From 1959 to 1964 the government drilled 62 artesian wells, 49 of which have been successful. These were supplied with water pumps and houses, and they produce 874,000 m³ annually. In the 1960s, 15 surface dams were planned and constructed in different locations to collect and store flood water for drinking. Furthermore, 1500 cistern wells, some of them originating in Roman times, have been restored for surface water storage.

The construction of seven feed storehouses at key points throughout the steppe was an important step initiated by the Ministry of Agriculture 20 years ago. This measure was reinforced by a World Food Program (WFP) project that provided funds for emergency feed reserves and for the issue of loans to Bedouin for purchases of feed during periods of scarcity. Another 40 warehouses were constructed for the sheep and range cooperatives. These have a total storage capacity of about 200,000 tonnes.

The National Feed Revolving Fund was established in 1965 with funding from the World Food Program. Funds are held by the Agricultural Bank and administered by the Sheep and Range Department of the Ministry of Agriculture and Agrarian Reform. One fund provides interest-free loans for purposes such as encouraging vetch and green-forage production, establishing alfalfa and Atriplex shrubs, purchasing machinery necessary for fodder and forage crop production, and financing warehouse construction. Another fund is now the sole source of official loans for the purchase of livestock feed. The objective of this fund is to supplement the credit traditionally available from merchants and to lower production costs for Bedouin and sheep fatteners. Loans are available only to cooperative members, who pay 20% of the cost of feed at the time of receiving the loan and are charged interest at 5.5–7.5%.

A system of grazing management once existed throughout the Arabian peninsula. Known as Hema, the system recognized and made legitimate the exclusive rights of particular tribes or lineages to defined areas of range. The Syrian livestock plan for the steppe is based on this traditional concept of exclusive grazing areas, but, for the sheep owners, cooperatives have been established as the organizational units.

The first sheep and range cooperative was established in 1968 (Project UNDP/FAO/SY 168/011), and by 1979 there were 54 cooperatives comprising 11,625 members owning 1,014,499 sheep. The government's aim has been to allocate at least 50% of the steppe to cooperatives by 1980 in an attempt to combat overgrazing and to protect vegetation by limiting the numbers of animals owned by each member.

In addition to being the organizational units for range improvement, the cooperatives are an institution through which the necessary inputs and services can be provided to steppe livestock owners. These include supplementary feed, credit facilities, improved water resources, feed stores, veterinary and health care, and education.
So far, these sheep and range cooperatives seem to have meant better services for cooperative members; however, they have not resulted in a better grazing system.

Sheep-fattening cooperatives have also been established; their objective is to encourage sheep offtake from the steppe in general and to develop and improve sheep-marketing facilities. Fifty-eight fattening cooperatives have already been established, mostly on marginal land and close to the main towns. These serve 3732 members. The annual capacity of these cooperatives is now 1,205,876 sheep.

Other steps taken to improve the area include the prohibition of plowing in the steppe. A decision for control of plowing was initially taken by the High Executive Council but was repealed by another of the Syrian Council of Ministers in 1962. In 1971, Legislative Decree No. 140 was passed and it officially prohibited plowing of the steppe. In 1973, Law No. 13 was passed by the Syrian Parliament to endorse and amend the decree so that the difficulties observed during the first 2 years could be eliminated. Syria has, thus, become the first country in the region to initiate and support such a comprehensive range conservation policy. The government has also encouraged nomads to transplant shrubs (Atriplex sp.) in the cultivated depressions of the steppe and in marginal areas. These shrubs, which are drought resistant and salt tolerant, provide protection and help regeneration of the natural plant cover. By the end of 1978, 2588 hectares of Atriplex were planted with incentives from a World Bank program (project 2018).

**future priorities**

There are many people in government, universities, and research who devote their time to conserving the ancient lifestyles of people such as the Bedouin in the Syrian steppe. Often, they ask themselves two questions: What is the future of the Bedouin in Syria? And how can emigration from the harsh steppe environment to the apparently more secure urban life be discouraged? Some priorities in development could help answer these questions. They must be given increasing attention. For example, the development of a sheep dairy industry and a handicraft business for youths would increase earnings and improve life.

Means by which the level of literacy among the young Bedouin can be raised above the current 10% should be investigated. It should be possible, for example, to open free boarding schools in each community, during the main nomadic period from October till the end of February. But it is absolutely essential that any social change to the Bedouin’s way of life be carefully planned and implemented by means of teaching and extension campaigns.

Many Bedouin are now very eager to send their children to schools, and I have seen in some communities a villager assuming the role of instructor to teach the Koran to the young. The lessons are given in a room in one of the houses built in the steppe. Parents living in the neighbourhood are willing to send their children for 3–4 months and to pay a tuition of 300–400 Syrian lira.

There is a need to review existing laws and thereafter to propose new policies designed to maintain and eventually to improve the steppe region. Measures to halt the indiscriminate cultivation of the steppe, to regulate
grazing, limit flock size, and allow regeneration of the plant cover need to be studied and introduced. The encouraging tendency of the Bedouin to cordon off small basins for grazing close to their winter dwellings should be promoted. This activity is an indication that the Bedouin themselves appreciate the need to protect sufficient grazing area for their sheep. It is also a step toward a more settled form of agriculture on a defined parcel of land.

Cooperatives should be given priority. They provide the institutional framework by which grazing can be regulated, and the supply of feedstuffs, the marketing of sheep products, and the development of other services can be improved. Important services to be made available to the Bedouin include veterinary and animal nutrition services, which are keys to increasing animal productivity in lambing and milk yield.

studies of steppe livestock systems by icarda

One of the major projects started in 1977 by the Farming Systems Program of ICARDA was the study of existing farming systems in Aleppo province. Each month, 85 farmers representing eight villages were interviewed. The villages vary in annual rainfall from about 250 mm to more than 600 mm. On these farms, cropping is the dominant enterprise, but livestock are important in the low-rainfall areas.

An extension of this study into the steppe zone of the province was initiated in January 1979, involving about 28 Bedouin farmers in three areas. In this zone annual rainfall is usually about 200 mm, and the Bedouin depend almost entirely on livestock for their livelihood. Thus, the complete spectrum of farming systems is being investigated, livestock becoming increasingly important to the farm enterprise as the annual rainfall diminishes. The flocks being studied range in size from 6 to more than 500 head per family. The major objectives of the livestock study are:

- To increase knowledge of the systems;
- To enable the identification of the major factors that limit production; and
- To enable recommendations aimed at improving animal performance and range management.

To achieve these major objectives, ICARDA staff are gathering information on sheep management systems, flock movements, feed costs, returns, and animal productivity. Later, more detailed measurements of feed inputs, animal health, and performance will be collected. This information will make it possible to compare livestock systems across the province and to assess the current and future significance of transhumance to the Bedouin sheep farmer.

discussion

Conant: What is the effect of trucks on pastoralism in Syria?

Bahhady: In the early 1950s, tractors and trucks were introduced onto the steppe. The results were: First, a large area of the best range in the steppe was brought under cultivation, and many Bedouin migrated to towns for work. Second, the Bedouin could move their sheep more rapidly with these vehicles so that overgrazing and early grazing became problems. On the
other hand, tractors and trucks helped the Bedouin to manage their flocks better by exploring better grazing areas, transporting their feed and water, and helping them market their products. Tractors and trucks are now becoming a problem to the Bedouin because of the rapid increase in prices of machinery, gasoline, and spare parts.

Dahl: You mentioned the use of camels. Were they bred by the Bedouin in your study or by a specialized group? What is happening to the camel population?

Bahhady: These animals were bred by all Bedouin on the Syrian steppe. In 1958–60, a severe drought reduced the number of camels from 81,000 to 18,000 head in 1961 and subsequently to 8,600 in 1978. In 1961, Bedouin began to replace camels by tractors and trucks, and that was the main reason for the further decrease in camel numbers.

Salesman: If the Bedouin population is decreasing, just who drops out of the pastoral system? Is it the very poor and the very rich, as with the Basseri according to Barth?

Bahhady: Yes. In marginal areas, the reason has primarily been cultivation of the range, followed by crop failures.

Khogali: Could you please elaborate on the collapse of el-Hema? Also, why have handicrafts declined? Is it because of preference for imported goods or shortage of time, due to the emigration of men and the education of women? This decrease in handicrafts is unfortunate, because these crafts can be a good source of additional income.

Bahhady: El-Hema is the system that recognized and made legitimate the exclusive rights of particular tribes or lineages to a defined range. The Syrian government plan was to apply this concept through establishing cooperatives for the Bedouin, which would cover 50% of the steppe by 1980. The disappearance of handicrafts in Bedouin societies can be attributed to the availability in towns of these items, which are made locally and cheaply.
the role of government in pastoral development
The mobility of the Gabora and other pastoralists complicates governments’ efforts to provide technical and social services.
Nomadic peoples are often viewed as fundamentally opposed to the state, which has difficulty in both exercising its control and delivering its services; conversely, by pursuing its mandate for national development, government has become the primary source of constraint and pressure on pastoral systems, through the appropriation of land for alternative uses, the securing of low-cost protein for the urban populace, encouragement of game parks, etc. At the same time, government is the conduit for virtually all programs of pastoral development that aim to address the current crises. Most development agencies today are concerned with the design and implementation of organizations for pastoral systems that would serve as frameworks for local production, increased commercialization, and modernization in general. The papers in this section reflect a diversity of opinions on whether such organizations impede or assist pastoral systems and how to set about analyzing and assessing them.

Sandford’s contribution doubts that labels such as “groups,” “cooperatives,” “grazing schemes,” “collectives,” etc. are useful tools in comparison of different development schemes, because they are often dissimilar with respect to internal organization, such as the form of decision-making, style of management, the delivery of governmental services, and so forth. Pursuing the point, Galaty suggests that undue focus on organizational structure leads the analyst to ignore fundamental and significant factors in organization such as the tacit aims of planners, the environmental input, or pricing policies. In the Jordanian case, Abu Jaber and Gharaiibeh point out that processes of sedentarization are not always government-generated but at times result from Bedouin demands for services. Khogali maintains that nomadic land use is wasteful and, from an environmental and governmental point of view, recommends that sedentarization in the Sudan be accelerated. In analysis of the Mali case, Cissé describes sedentarization and points out a growing convergence between sedentarized nomads and “pastoralized” peasants. Awogbade maintains that the Nigerian government should continue the establishment of grazing reserves to control rangeland use, encourage increased commercialization for the national benefit, and stimulate eventual settlement. Jum’a outlines government services that could be provided to the Bedouin of Oman.

The cases support the view that sedentarization of nomadic peoples is occurring independent of government policy and organization, but the authors differ on their perceptions of sedentarization as a positive or negative outcome of present circumstances and on their views of government’s role. It is clear that regional, social, environmental, and organizational differences make universal solutions difficult and in-depth study in each area desirable.
organizing government’s role in the pastoral sector

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If governments are to intervene wisely in the pastoral sectors of their economies and better serve the interests of their pastoral populations, then scientists, whether natural or social, must start to organize the findings of research on pastoralism in a coherent way that enables managers and decision-makers in government to take advantage of it without first having to educate themselves to a PhD standard in each of a dozen or so sciences. I do not believe that one can reduce research to a handful of simple rules to be memorized and applied blindly, but I do think that the way decision-makers think about managing the pastoral sector and the way that scientists provide advice have to be structured, like the grammar of a language. Learning a language whose grammatical structure has been set out in a textbook is much more efficient than learning it by trial and error. A grammatical framework is needed to structure one corner of decision-making so that additional pieces of information deriving from experience and research can be easily incorporated into the structure in a way that leads to better decision-making and management.

This paper sets out to do three things. The first is to establish a framework for arranging researchers’ thoughts that will help them to formulate hypotheses that are useful to the specific purpose of improving government’s performance in the pastoral sector. The second is to demonstrate the utility of this framework by providing examples, from a restricted field, of the sort of provisional hypotheses that emerge. The third is to examine how research might be undertaken to test the validity of the provisional hypotheses.

the framework

The framework I suggest contains four interlocking elements. The first of these is the aims of government interventions in the pastoral sector. The second and third elements together consist of the various options, which I subsequently refer to as policy variables, open to government in deciding its role. The second element comprises the fields (e.g., security, land tenure, veterinary services) in which it is to intervene and the technology and scale of operations that it is to employ. Generically, the second element is the components of intervention. The third element is the way in which government intervention is organized — organizational forms. The fourth
element is the circumstances or factors in particular situations that determine results. Such factors may be characteristics of the natural environment, e.g., the unreliability of rainfall or the availability of groundwater, or they may be the social and political structure of the pastoral society, the population density, or the relations between the pastoral society and the central government of the nation-state in which the society is incorporated. Factors are local characteristics that, for the purposes of the intervention being considered, are immutable.

In the framework, one builds hypotheses about the relationships between the four elements so as to guide managers and decision-makers on how to proceed. As an example, I will take a situation in which government has two major aims: to maximize, for the benefit of urban consumers, the long-term average output of meat from a pastoral area; and to increase the economic security of the poorest groups of pastoralists in the area. One policy (variable) being considered by the government is whether or not to control livestock numbers to alleviate pressure on grazing. The reliability of rainfall in the area and the degree of social stratification in the society are two of the factors that will influence the result. I have expressed elsewhere (Sandford 1978) my opinion that the more unreliable the rainfall, the less desirable, in terms of long-term output, is control of livestock numbers; in socially stratified societies, during droughts — times in which lack of rainfall induces deficits between the supply of and the demand for livestock feed — the rich get richer in relation to the poor. From this example, two hypotheses can be derived:

- **If your aim is output maximization** then you should control stock numbers in areas with relatively reliable rainfall but not in areas where rainfall is unreliable.
- **If your aim is economic security of the poorest**, then the more unreliable the rainfall and the more unequal the society, the more you should control stock numbers.

These are the beginnings of a set of hypotheses in a coherent framework that one can offer to managers and decision-makers.

**the policy variables**

Governments of countries with large pastoral sectors have habitually intervened in particular fields — that is, the components of intervention have been similar. Often the sequence of intervention has also been similar. Government's first function has usually been the establishment of public security — generally seen as protecting the persons and property of government officials and traders, later also the persons and livestock of the pastoralists, and much later, if at all, their other property and personal rights. The second function has been the allocation of land either to particular people, whether groups or individuals, or to particular uses, e.g., wildlife reserves, forestry, extensive grazing, rainfed or irrigated agriculture, etc., according to land-use planning criteria. The third function is the development of new water resources; the fourth, the provision of social services such as communications, education, and health. The fifth is the provision or regulation of livestock-marketing facilities; the sixth, the provision of animal health or breeding services in the form of mass vaccinations, improved bulls, or artificial insemination; the seventh is the management of pasture through
adjustment of the length, season, or intensity of grazing use or by land shaping and forage planting; the eighth, the provision to individual pastoralists of production inputs such as capital, technical advice, fencing material, or of consumption goods such as grain. In some cases, governments have tried to introduce pastoralists to rainfed or irrigated agriculture.

Choosing components is not just deciding in which field to intervene but also determining what technology to employ. Choice of technology in the pastoral sector, as in others, needs to be guided not only by narrow criteria of technical efficiency or financial costs to government but also by broad considerations of aims. For example, the choice in water development between constructing dams and stockponds or drilling deep boreholes will largely be governed by technical considerations such as the presence of water-bearing formations in which boreholes can tap water and the suitability of the slope and type of soil for dams and stockponds. However, one must consider other implications of choice: What will the introduction of boreholes do for the relations between the pastoral sector and the nonpastoral sectors of the economy? Under what circumstances is the consequent increased dependence of the pastoral sector desirable? What about the relations between individual pastoralists and those who operate the boreholes? Under what circumstances can or should borehole operators "close down" areas of grazing by stopping the pump? What are the implications for the relations between the wealthy and the poor and stockless who, where water requires a lot of labour to extract, can earn livestock by watering the animals of the wealthy?

forms of organization

How can one systematically analyze differences in organizational form? Government interventions take many different forms of organization. Most of the literature so far seems to have analyzed differences in terms of the labels attached to particular institutions. Family ranches have been compared with company ranches, with group ranches, with collectives (negde/s in Mongolia), and with grazing schemes; range management departments of government have been compared with livestock ministries; and vaccination campaigns have been compared with integrated pastoral development projects. I suggest that this approach is not very fruitful because, for example, company ranches differ from negde/s not in just one respect but in several; hence on the basis of such comparisons, one cannot attribute, nor more importantly predict, differences in performance, even where two institutions exist side by side in the same environment. Some of the respects in which they differ will affect performance and some will not. Moreover, some will operate in opposite directions, one improving performance and another worsening it.

There are many ways in which organizational forms differ from each other; what one needs to do is to select and focus on just those few differences in organizational form that, in a pastoral context, are most operationally significant and that can be the object of choice, i.e., are policy variables and not givens. The relative significance of different organizational variables is likely to vary between different components of government intervention; there are some that emerge as critically important in respect of one component or of considerable importance in several components.
The first organizational variable relates to the locus and style of management. Where (at what level in a managerial hierarchy) should decision-making or action be? Is it to be relatively centralized or dispersed? For example, should the district range officer decide to move livestock from one grazing area to another or should each herder decide where livestock under his or her supervision should graze? To what extent should decision-making (whether centralized or not) be participatory, with as many as possible of those involved in implementing or bearing the consequences of decisions participating in them? What should be the style of management? Should the application of decisions to individuals or groups be authoritarian, with those affected being allowed no escape and being punished for their transgressions? Compulsory mass vaccination campaigns are examples of an authoritarian style. Or should it be liberal, with those affected by the decisions being given incentives to comply with them but being allowed at any time to opt out? The provision of optional vaccination free of charge is an example of a liberal style. Or should the style be contractual, halfway between authoritarian and liberal, where those affected are offered a package of incentives in return for an agreement to conform to the decisions but where once they have entered the agreement they cannot then back out without severe penalties?

The second organizational variable is the extent to which government interventions are multifaceted and integrated or single purpose and uncoordinated. At one extreme is the camp-level worker responsible for vaccinating livestock, providing health services, undertaking extension work for range management, arranging sales of livestock or products, and coming under the direct line control of a district pastoral development officer. Specialists in range, education, and veterinary science would work in a staff relationship to the district pastoral development officer. The whole range of activities would be components of a single plan integrated at provincial, and approved at national, level. The Drought Prone Areas Development Project in India probably comes closest (although not very close) to this model. At the other extreme is the common situation in which separate ministries each have their own field-level workers who rarely meet except in coffee shops. Each ministry pursues in pastoral areas a policy essentially designed, often on the basis of experience gained in nonpastoral areas, to minimize its costs. Usually, several of the policies of different departments contradict each other. In between these extremes of integration and disintegration one can have multipurpose camp-level workers responsible to different ministries for different aspects of their work, or single-purpose field workers reporting to specialist district-level officers who are subject to the coordination by, or direction from, a district-level project director or development committee. Another alternative is for government to opt out of some components leaving them to be implemented by private enterprise or the pastoralists collectively.

The third organizational variable is the qualifications of staff to be recruited, retained, and promoted. Is the emphasis to be on formal academic and professional qualifications or on local knowledge and acceptability, as evidenced probably by membership of the local pastoral society? The slow and late development of education facilities in pastoral areas has caused a particularly sharp contrast between "expert" and "local." Even where local experts are available, arguments are sometimes raised against employing them in their own locale.
A fourth organizational variable is the way in which government services and officials link up with the pastoralists. Government services may be organized on a territorial basis — by province, district, or subdivision or by water point. In such cases, if the pastoral population is mobile (nomadic or transhumant), a particular official’s clientele is likely to change in both size and composition over time. One time of year will be busy and another slack, the clientele having moved elsewhere; in areas where different pastoral groups tend to use an area in regular or opportunistic succession, an official is likely to be constantly dealing with fresh groups of people and livestock with whom he or she is unfamiliar. Alternatively, government services may be organized on the basis of social groups so that the same officials deal with the same groups wherever they may be.

The linkage of government services may be with major lineage groups, camping groups, or voluntary associations who have come together primarily as users of a particular government service or for a particular economic purpose, e.g., marketing. In sedentary pastoral societies where social groups are associated with particular territories it makes no difference whether one organizes government services on the basis of territory or of social groups. In nomadic areas and societies, government services organized on the basis of social groups may have difficulty in linking up with other government organizations based on territorial lines.

The last organizational variable is the extent to which government should link up a new service with pastoral society through some new single- or multi-purpose organization of pastoralists or through some existing social organization, even if its prime function is in a different subject area.

The organization variables seem to me to comprise options that constantly recur for the same government in organizing its intervention in different components and for different governments in organizing the same components. For this reason, it should be possible for social scientists to draw on knowledge of societies and organizations in general and on their experience of government interventions in pastoral sectors in particular to provide some guidance on how governments should choose among options in a way that improves the provision of services to pastoral people. A number of questions remain. To what extent do the five policy variables cover the field of important options? Is it true (as I believe) that many practical issues of how to improve systems of pastoral management can, on closer inspection, be reduced to questions about these selected policy variables? Or will using these variables as kit-bags lead to ramming into them questions that really do not fit? Are the static nature of the optimizing model and the implied lack of interaction between variables acceptable? For example, this model suggests that if the degree of centralization or dispersion in one of the components is a bit wrong then a bit of a shift in that variable can rectify the situation and won’t require a parallel readjustment in all the other policy variables. That seems a bit simplistic. Nevertheless, I am sure this model improves on the present situation in which one often establishes management systems with characteristics that seem to some people to be inevitable but are actually policy variables.

factors

One must beware of universal prescriptions such as “it is always better to decentralize decision-making in range-management” or “governments
should always recruit field-level veterinary workers from among local pastoralists." There are no universally valid prescriptions. What is the best thing to do will depend on one's aims and on particular circumstances. These circumstances, or factors, contrast with policy variables in that a policy variable is what one can control; a factor, in any particular situation, is a given. What is controllable or given may vary from situation to situation.

What are the factors that most often and to the greatest extent affect the results of manipulating the policy variables? Suppose for example that one has a strong interest (i.e., the aim), on the one hand, in procuring a stable supply of livestock products from pastoral areas without ecologic degradation and, on the other hand, in raising the material standards of living and social position of the weakest households in pastoral society. The government is contemplating a program of intervention — to limit the number of animals grazing on common land. The policy variables it is considering are the location of decision-making about how the right to graze animals should be distributed between households within an overall limit, i.e., grazing quotas, and the extent to which a traditional institution — perhaps a hereditary leadership position — should be used to assist in applying these quota allocations. What will be the consequence (in terms of aims) of particular manipulations of these policy variables under different situations as to one factor?

The degree to which power is shared among members of a society is an illustration of such a factor and can be regarded as immutable in the short term. Two situations can be contrasted. In one, power in pastoral society is rather equitably distributed and in another inequitably. I will first consider the equitable situation. The district range officer decides to arrange the allocation of quotas (i.e., this is a centralized system) using a new organization — an advisory group of selected pastoralists — to help in drawing up the rules and to identify eligible stockholders. The chances are strong that the result will be a quota system that inequitably favours people like members of the advisory group, who are a somewhat homogeneous group of people whose opinions closely resemble those of the district range officer and who have become conspicuous to the officer, possibly because they live nearby or are already regular customers of several government services. If, in contrast, in such an equitable society, the range officer delegates the functions to junior field-level government staff operating in conjunction with an existing pastoral institution, the resulting quota allocation is likely to be imbued with the same values and limitations on personal aggrandisement as the society in which it is embedded, for the junior government staff will be unable to withstand pressures from the existing organization that will itself reflect the existing egalitarian distribution of power. Although the resulting quota allocation will be more egalitarian, it is likely also to be much slower to set up, due to the necessity of obtaining consensus between different interest groups (e.g., those who specialize in different categories of livestock) and it is likely to operate in a quite different way in adjusting stock numbers rapidly in response to fluctuations in rainfall and the condition of the grazing, than a program centrally controlled by the range officer.

In contrast, what will happen in an inequitable situation of power? If decision-making about quota allocation is, in such circumstances, decentralized to junior field-level government staff, they, whatever their personal preferences, will be quite unable to withstand the pressure from local "big men" exercised through traditional organizations. The quota allocation
seems certain to be highly inegalitarian though it may work speedily and at low cost. In contrast, a centralized system, even if overinfluenced by a new organization staffed by the range officer's cronies, has a greater chance of protecting the interests of the weakest households.

This is an example of one factor (degree of equality of power) operating in respect of two organization variables (locus of decision-making, use of existing institution) in respect of quota allocations. I have, over the last year, been working my way through various aspects of just two frequent components of government interventions in pastoral sectors. These components are water development and range management; I have been trying to identify, from experiences in Asian and African countries, the main factors in determining the consequences of manipulating the key policy variables in particular ways. The list that emerged has rather few surprises in it. Five factors, in respect of these two components, stand out as recurring again and again; they are separate but are closely related and interdependent:

- The reliability of the environment — primarily (but not exclusively) as manifested in the extent to which availability of animal forage fluctuates widely and unpredictably over time due to variations in rainfall;
- The mobility — and in particular the opportunistic and unpredictable mobility — of people and animals in the nomadic and transhumant movements;
- The degree of competition between social groups for the same resources of land and water (I do not have a satisfactory definition of such competition. To an extent all individuals and groups tend to compete with each other. An East African illustration is that Boran groups compete with Somali; different Somali clans, subclans, and lower level lineage groups compete with each other; but Boran groups do not compete to the same extent with other Boran groups for the same resources of land and water);
- The density of the human population; and
- The degree of inequality within the pastoral society.

some illustrations

The utility or otherwise of this sort of analysis can be illuminated by a selection of some hypotheses derived from my work on water and range development. The hypotheses represent the conclusions of arguments, sometimes quite complex, rather than the arguments themselves; they concern two factors, the reliability of the environment and the mobility of the population, with various policy variables. ¹

reliability of the environment

- The more variable the rainfall, the higher the proportion of total land area that should be opened up, by dry-season grazing, to water development.
- The more variable the rainfall, in both space and time, the more it will be necessary either to allocate land in very big blocks for management

¹ For brevity I am not here also specifying the aims with respect to which the normative statements are made.
purposes or to have a land tenure and management system in which flexible arrangements (almost certainly decentralized) are possible for moving livestock between small blocks.

- In general, the more unreliable the environment (in both space and time) the more decentralized must be the management system.
- But the more unreliable the environment, the more likely it will be that opportunistic nomadic movements will occur and there will be strong competition for grazing between social groups. In such circumstances a participatory decision-making and management system will be inappropriate and a more authoritarian (though decentralized) system will be required.

mobility of the human and livestock population

- The more mobile (especially opportunistically mobile) the human population, the less will it be able to manage complex and expensive water supplies and the more government will have to intervene (where, for technical reasons, complex and expensive supplies are inevitable) in their management.
- The more mobile the population, the less feasible will it be for government to attempt to adjudicate the property rights of individuals (rather than of social groups) and the more it will be necessary to involve pastoralists’ organizations in such adjudication.
- The more opportunistically mobile the population, the less does a representative committee of pastoralists represent a viable communication link on management matters between government and pastoralists.
- The more mobile the population, the less appropriate is it to have territorially based and dispersed extension agents. Either they need to be centralized (e.g., at district HQ) and sent out on extension campaigns wherever the population is congregated; or they need themselves to be nomadic and to be attached, in a very decentralized way, to the lowest tier of the pastoral population that normally moves together — probably an encampment.

These hypotheses may seem rather banal; yet in most countries the management of interventions by government in the pastoral sector seems to incorporate hardly any thinking about the issues with which the hypotheses deal. I suspect that, on the one hand, most academic social scientists will feel that the hypotheses correspond to a rather oversimplified, mechanistic, model of the real world, and, on the other hand, most managers in executive positions will see scarcely any connection between the policy variables that I have identified and the performance of their projects.

There can be no universally valid rules for a manager to follow blindly. Possibly these hypotheses look a bit like rules; they are, of course, very conditional rules — the impact of a policy variable is not unequivocal but dependent on the factors operating in a particular situation. There is another sense in which they are not rules: two factors, both operating in a particular situation, may provide conflicting guidance about what to do; for example high-population density may indicate one approach, whereas some other factor, say the degree of opportunistic mobility, may indicate the exact opposite. The manager, or decision-maker, even in the light of the guidance these hypotheses provide, is still going to have to use judgment about what to do.
What is the validity of a hypothesis such as these? These specific ones have arisen from my reading of the literature about pastoral societies and pastoral development programs, from the visits I have made, and from the planning work that I have done on specific pastoral development projects. Clearly, there ought to be a distinction between the process of formulating hypotheses and that of testing them; the title "research" in social science tends to get applied to both processes. In the past, rather little research has been done on the efficacy of government's operations in their pastoral sectors. Virtually no research has been done on the kind of management issues that I have raised in this paper; and absolutely no work (as far as I am aware) on hypothesis testing about these issues. Yet, field research testing some hypotheses of this sort is possible; David Leonard sets out some examples in his book on *Reaching the Peasant Farmer* (University of Chicago Press 1977), which compared different approaches to agricultural extension work in Kenya.

The more conscious I become of the numbers of potentially different policy variables, and of the different factors that influence their impact, the less satisfied I am with studies where single cases are examined and conclusions are drawn about the impact of one or more policy variable in that case. I am an economist with a child-like fascination for econometrics. I suspect that the formulation of my conceptual model betrays my hankering to construct quantitative indices of the application of particular policy variables, of the extent to which factors operate, and of the degree to which aims are achieved in particular situations so that the relationships can be tested through multiple-regression techniques. I am, however, wide open to suggestions for other more reliable methods because my hankering stops somewhat short of conviction. One of the (many) problems of the single case-study approach is that it is so much better at showing that what governments think they are doing is not what is really happening and does not work very well than it is at identifying what actually works better.

Social scientists interested in pastoralism need to expand the range of their interests to include what happens on the government side of the government/pastoralist fence. It is not just a question of discovering what government should, ideally, do but also of influencing the actors in government. The considerable sophistication of the understanding of pastoral societies is not matched by any corresponding knowledge about the social environment in which officials live; they are the subjects, therefore, of precisely the same sort of insulting misunderstandings that nomads have been in the past. The roles that some of them, particularly the socially isolated officials of range management departments, are called on to play must be among the most difficult in the world. A greater appreciation of how they view the pastoral world and how they react to pressures, incentives, and different organizational forms is important in increasing the understanding of how to improve governments' performance.

If one is to identify not only what is going wrong with the way governments manage their pastoral interventions but also how they might be improved one needs as wide a range as possible of actual experience of different approaches under similar conditions. Then actual can be compared with actual rather than, as so often, with ideal. Governments, in designing
their pastoral interventions, should deliberately not choose a single model approach that they believe will be best but try, in the same area and at the same time, several different approaches. If the results are to yield the information needed, the approaches must not be so different from each other that one cannot attribute the differences in result to particular differences in approach. In Kenya different approaches (range blocks, group ranches, company ranches) have been tried, but because they have been tried in different ecological zones and are so radically different from each other, it is all too easy for one to argue about why there have been differences in results.

**discussion**

**Willby:** Is there another important range of options available to government between the extremes of the self-centred, relatively short-lived projects and long-term support of agencies?

**Sandford:** Yes. The project-versus-program approach occurs one level up in the hierarchy of government and concerns how government organizes itself. I have touched on the project-versus-program approach in another paper, "Learning from the experience of pastoral development," delivered at an ILCA (International Livestock Centre for Africa) symposium on The Design and Implementation of Pastoral Development: Projects for Tropical Africa, in February 1980. I agree there has been overemphasis on the project approach, which is short-term, and that interventions in the pastoral sector have to be long-term.

**Aronson:** Your critique of anthropology's ideology of local commitment — that decision-making must always evolve all the way down the ladder — is welcome. But it sounds as though you have a record of success and failure that tells you that cases are all different. Anthropology has an ideology of local commitment because anthropologists have seen that greater centralization of decision-making has not been beneficial to pastoralists. The anthropological commitment is based on a conviction that no programs have succeeded, that the only record is of control and centralization. Is there, then, a record of cases to support your argument that success depends on much more open postulation of how services are organized?

**Sandford:** The difference between the kind of work I do and the kind of work that most anthropologists do is that anthropologists tend to be concerned with very detailed studies of a particular society, while what I’ve been trying to do over the last 4 years is to take a global view of lots of projects in lots of places. The last thing I want to do is to pretend that I have tested these hypotheses — I haven’t — just from looking at characteristics that seem to stand out. The question of the level at which decisions should be made seems to be important; certainly I’m not saying what is needed is central decision-making. Indeed, my contributions criticize central decision-making.

It is important to ask: should the decisions of where the animals graze tomorrow be left to the herder or the herd owner, or should it be left to the encampment of which the herd owner is one of the people involved? At what level in the hierarchy, either within government or on the other side of the fence within pastoralist society, should it be done? It doesn’t seem sensible always to push it down as far as possible. Take the example of managing a
water point. In an area where different ethnic groups use the same water points, then putting the decision-making at the level of the water point provokes all sorts of interethnic strife. The question of whether one level is better than another can’t be solved when there are two different groups competing at that level. Decision-making has to be taken a little bit further up the hierarchy.

There will never be total success in development programs; no matter how many criteria are satisfied, someone will always be able to identify one that the development program fails to satisfy. Nevertheless, while the pastoral record is not one of great success, there are bits of programs that have a better record than others, or whole programs that, at least for a time, have done better than others. Development personnel need to make use of relative successes. At the moment there are few or no programs in the same locale that use different organizational approaches for the same task so that a controlled experimental approach and analysis can be used in comparisons; instead one has to look at the relative success of a component of a program in one country and the relative failure of a similar component in another place and try to judge what accounts for the difference.

**Salzman:** I accept your argument that universal statements about what we should do are inappropriate, that we need to look at circumstances and say what should be done to achieve a certain goal. But in practical planning, there is often an imbalance before we even begin. For example, do not governments and their agencies favour a priori centralized, bureaucratic control? It is the nature of governments to have this bias. So a certain tendency already exists, and the power of the system is behind that option. Consequently, it is necessary to weight the range of alternative measures in the other direction, in favour of decentralization and democratic local control. Our general principle should be: control to local people, unless good reasons are demonstrated for another arrangement.

**Sandford:** It has constantly been said, not only by anthropologists, that the record of interventions in the past has not been one of success. There seems to be an openness in all kinds of organizations, like the World Bank, ILCA, and national governments, to reconsider their approach. But you don’t have to assume there’s only one way to manage a pastoral system. This issue is becoming more open precisely because people are aware of the extent of past failure.

**Salzman:** But who is actually making the decisions? There may be more options, but more options for which individuals to make the decisions? Are they more open for the World Bank or the Ministry of Agriculture, for example, to make decisions?

**Sandford:** Well, the World Bank is clearly one important decision-maker that does largely determine how its funds on pastoral development are spent. But I also see governments willing to reconsider their traditional approach — such as Kenya, Botswana, and Iran.

**Bahhady:** In any government plan to improve the steppe, a discussion should take place between the government and the Bedouin. To be successful, the government must cooperate with the Bedouin and consider their opinions and let them make decisions. It is also important to review the legal framework and projects previously implemented; an evaluation will help in future plans and programs. In the implementation of any project, it is
necessary to choose not only qualified technicians but also people who know the habits and customs of the Bedouin and how to behave with them.

**Sandford:** I agree that governments need to consult pastoralists and employ locally acceptable staff. But consultation is not necessarily the same as allocating decision-making to pastoralists. In some cases, decision-making needs to be retained by government. Consulting pastoralists is not simple; one needs to know which pastoralists will articulate which interests, and make sure that one gets a wide range of views. To intervene at all in the pastoral sector not only have you got to be technically well qualified, but you've also got to be able to understand what is going on. At the same time, one must be realistic: staff in pastoral projects do not have doctorates simultaneously in range management, anthropology, economics, and animal husbandry. In the real world, project staff are rather poorly qualified and need simple instructions. It seems to me we're trying to make life too complicated for the actual people who are going to operate the projects.

**Sihm:** We should distinguish what decision-making is going to be about. Take the case of the United States and the fuel crisis. If there were no central body when rationing began, it wouldn't work. Within a group of pastoralists — in Somalia for instance — you'll find bigwigs who are running camels and the guys who are just running sheep and goats, and they don't agree. They don't agree on how much water should be used; they don't agree on the management of the range. Putting decision-making at that level does not necessarily solve the problem.

**Goldschmidt:** I think Sihm's point is very important, one that anthropologists have been loath to admit. We still tend overwhelmingly to think people untouched by Western civilization and capitalistic economies are living in some kind of ideal situation. Decision-making always involves many different levels and operations. What perturbs me is the absence of input from inside the pastoralists' heads, so we do not gain the information necessary to make an intelligent decision as part of the process. This is of such importance that it should be institutionalized. I know anthropologists can't be transformed into these other kinds of technical experts, but somehow there has to be in planning an effort to get information about the Bedouin into the thinking of the administration, and I don't find it there now.

The decision-making process poses a knotty problem; I think the issue is information. Decision-making rests on information, good or bad. What troubles me is that the pastoralists' information, which is often the best available, is never brought into planning. It is the opening of this channel of information that the anthropologist should be particularly concerned with.

**Sihm:** At ILCA we hope technical administrators responsible for pastoral development will establish teams consisting of an animal scientist, an economist, a sociologist, and a range scientist. We need to get the human sciences involved, but that's going to take time. We hope these units will not only monitor project progress and impact but also serve in the predevelopment phase to identify research objectives. Here, on such interdisciplinary teams, is where in my opinion the anthropologist fits.

In planning, anthropologists have not played an appropriate role for two reasons:
• Planners have not known what the anthropologist had to offer, and whenever they tried actually to employ the anthropologist, they did so at the wrong time in the project cycle; and

• The anthropologist to a large extent insisted on using methods that generally are too time-consuming to fit in with other disciplines.

Equally, in implementation, the anthropologist has been scarce. Although it may have been suggested that an anthropologist should be there, very often the government was not in favour of having one around. It is important to restate that no one discipline can adequately explain pastoral production systems. The anthropologist, economist, animal scientist, and ecologist must work together to do that.

It is encouraging to see how anthropologists increasingly pay attention to economics and ecology. This will make them valuable members of interdisciplinary teams, especially if they are able to employ research methods that fit better with the other disciplines. I am not asking anthropologists to abandon what developers call "sitting under the acacia tree" — there is still a great need for in-depth research in many areas and situations. But I hope they will develop a quick procedure that would enable them to work in step with the other disciplines. Even now anthropologists have a useful role to play in the project preparation phase (1–2 years) and not just in the appraisal stage (4–6 weeks) in which they are now employed. They can point out areas of likely conflict and influence the design of the project decisively. However, let this not be taken as an argument for making anthropologists into development bureaucrats. That would be the worst we could do; rather we should make sure developers know where to get in contact with anthropologists working on or knowledgeable about certain areas and regions.

Horowitz: I am particularly stimulated by remarks by Sihm concerning what the anthropologist has to do to be useful to planners. The word "planners" today implies professional specialization; however, most planners are adherents of some discipline. Some are veterinarians, some agronomists, some range managers, some agrologists. And then there are the social scientists, who are called in periodically to provide information that they hope will be (and often is) useful. I have been wondering whether the utility of the information has something to do with the particular discipline — sociology, cultural geography, human ecology, and so on — of those involved in social analysis.

In 1973, the rhetoric changed quite a bit. Many of the donor agencies had begun to suspect that large-scale infrastructure projects did not benefit people. At least they had the notion that the beneficiary has to be identified. Some analysis of what a project is going to do for local populations is now required. Yet, if one looks at the development agencies, one finds little change in the persons who make policies. Policy is still the preserve of decision-makers, but the planners are professional economists, range managers — I am afraid USAID has its share of lawyers. But the planners are rarely social scientists. In AID there has been an effort certainly to include and preach the involvement of social scientists, but with only a few exceptions the social scientists are in junior positions without substantial influence. For instance, in AID, which I suspect is reasonably typical in this regard, the sequence is that the project is proposed, the money is allotted, and then the project is fully designed. By then, the momentum to go ahead is
so great that the concerns raised by social scientists ("this action will increase differentiation more than has been anticipated" or "this is going to cause certain changes that will be contrary to the interests of the project") are hardly welcome. Back in the home office of the development agencies there is no one to raise these concerns because the social scientists are outside the process by which the projects are undertaken. Many of the problems of communication between decision-makers and social scientists stem from the fact that most social scientists do not know the language of development and do not do their homework on ethnography of development. They are not sympathetic to the kinds of problems that planners face.
organizations for pastoral development: contexts of causality, change, and assessment

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"Organizations for pastoral development" implies activity by nonpastoralists: planning by representatives of national and international agencies charged with altering the economic and political relationships between groups practicing nomadic animal husbandry and their natural and social environments. Those given the mandate to act have concentrated on types of organization that they believe represent the best means of fundamental change of pastoral systems. The issue of organizational form and efficacy brings the question of assessment to the fore: Which organizations work? And why? A recent workshop was dedicated solely to the task of assessing what has been accomplished in the domain of livestock development (Institute for Development Anthropology 1980), and the paper in this publication: "The failure of African livestock development projects" by Goldschmidt indicates that what has been achieved is far from what was hoped.

This paper will develop the thesis that overconcentration on organizational structure or form and its immediate causal implications or entailments results in the myopic neglect of factors fundamentally involved in the determination of the outcomes of organizational innovations and the future of pastoral peoples. I will initially discuss the ecological crisis that has resulted in the focus on organizational forms and enumerate a few cases that illustrate the drawbacks of the framework of mechanical causation underlying many programs of planned change. I will then suggest several lines of research concerned with the assessment of organizational innovations:

- The logical relationship between organizational structure and stated objectives should be carefully scrutinized, rather than being accepted, for, so often when objectives are not attained, the responses of pastoralists are faulted rather than the design or motivation of programs. In particular, the conceptual frameworks and organizational guidelines of planning should represent yet another object of research and explanation rather than the point of departure of inquiry.

- The functioning of organizations should be assessed within the context that bears on them and lends them each their specific content. This paper will discuss several contexts that may be as influential in
the determination of pastoral response as the jural structure of the organization: the tacit aims of planners and project implementers that may contrast with explicit goals; other organizational forms and institutions that coexist with and inevitably inflect the program being considered; environmental conditions and resources that form the essential input into the organizational innovation; and external demands and rewards that influence project outputs. In short, if such factors are not understood and incorporated into the framework of assessment, it is difficult to come to conclusions of comparative validity about the effects of one or another organizational form.

The role of the social scientist in development may appear to oscillate between analyzing and prescribing. Although the roles are distinct, one often leads to the other. Planning and programs of development, however, often follow less from analysis than from political exigencies and theoretical frameworks that assume the obligation to produce change and, in an institutional sense, to produce results. Whereas social science and planning should not be estranged as are the conceptual and the practical, there should be tension between them because the roles of decision and assessment must remain separate if creative reconsiderations are to be possible. The struggle between development programs and social science analysis should be accepted, as it spawns constructive change.

**pastoral crisis and organizational response**

The prevalent view, influencing development planning for pastoralists, is based on an ecological model of relationships between land, the means and methods of pastoral production and consumption, and forms of social organization and cultural values. This view assumes that pastoralists have adapted to their environment and that rapid change disturbs the adaptive equilibrium and may result in institutions and values inappropriate to their environmental and economic bases. For example, mortality in the pastoralist society has decreased because of improved health services and decreased warfare, but the economic strategies and organizational forms have not changed to meet the demands produced by increased human and animal populations. Development planners who take this view believe they must accomplish what "natural" evolution cannot achieve: a rapid change to a new equilibrium through modernization of the pastoral economy and society. In particular, this model asserts that "traditional" forms of land use and tenure and strategies of population growth must be changed, and, to that end, they prescribe specified land rights, responsible land use and market involvement that will limit numbers of livestock and that will make accessible to pastoralists the means for acquiring the attitudes symptomatic of the profound change called "modernization." This view has been detailed by Konczacki (1978).

Planners, who wish to initiate land-use patterns that ameliorate desertification and pasture degradation while stimulating the diffuse transformation of modernization, often follow a somewhat mechanical model of social causation. They define the problem as the quality of environmental resources — the essential ingredient for the sense of crisis — and they see the solution in an alteration of attitudes and values that underpin inappropriate patterns of economic activity or as a change in the organization of the
economy and society that both produces those attitudes and stimulates the crisis. Thus, within the logic of planning lies an implicit social theory predicated upon a hierarchy of institutions that change according to different laws over time. The development planners attempt to introduce change through education and political exhortation, but if this approach is ineffective, then they intervene at the social level: organizations for development. In effect, the organizational innovation is conceived as a key variable, the change of which will produce concomitant changes at other levels: appropriate behaviour in the economic domain and appropriate thought in other domains.

Once development planners have accepted the model of crisis and this framework for explanation and change, they can blame the failure of organizational innovations on the irrational propensities of pastoralists to ignore laws of social causation. If victims they be, the fault is theirs.

Within such a framework, focus is narrowed to the process of program design and implementation, the organizational structure, and the behavioural outcomes. The model itself establishes the parameters of assessment; therefore, it does not come under examination. Three aspects of the model, however, need to be questioned.

analysis of organizational contexts

First, what is the nature of the ecological crisis that sweeps away pastoralism in its path? There is increasing evidence that the environmental degradation that resulted from the Sahelian drought was temporary, was part of a climatic cycle, and was produced not only by pastoralists but also by land use for development and change associated with modernization. Furthermore, the condition of the range was widely attributed to a combination of desiccation and overgrazing, but evidence exists that in many cases the results of grazing were reversible and that the sense of crisis was produced — at least in part — by the improvement of monitoring techniques and the unprecedented attention given the problem. Without underestimating the environmental factor, one must ask what forces contribute to the extraordinary emphasis placed on ecological factors in the absence of firm, longitudinal evidence. The ecological perspective is itself an ideology, which must be understood as such and is as much deductive as based on evidence. The diverse motives of those who would circumscribe pastoral practice and resource control find a ready framework in the ecological model, which undermines the pastoral privilege of livestock production in the service of a higher ethic: the perpetuation of natural heritage (Hoben 1979; Jacobs 1973a, b).

Second, what are the forms of organization and what ends do they serve? Organizational plans often originate in the international domain and are applied in diverse circumstances for diverse ends. Indeed, each form has its own constituency and comes to have a life of its own of an essentially political nature. The group ranch, for instance, was set forth as a mechanism to encourage increased livestock marketing, through a series of intervening steps. The influence of AID (the United States Agency for International Development) in the conceptualization of semi-arid land organizations in Kenya and Tanzania has resulted in the creation of similar forms in the two countries, despite the radically divergent ideological emphases placed upon them in each country. It is important to consider not just the technical label of
the organization — for example, group, cooperative, association, collective, etc. — but also the specific features of the form in each locale.

Third, how do proposed aims actually relate to the structure of the organization? Does the structure promote the aims or are the aims — projected outcomes — merely a reflection of political environment, the planners forecasting outcomes that are politically acceptable in an effort to have their plans put into action? Marketing of livestock is often seen as a desirable outcome of groups, but this goal relates as much to national needs for meat and national pressure for a centralized livestock industry as it does to the structure of the organizations proposed to effect it. Much evidence exists that behavioural ends and organizational means cannot always be linked in such a way that the latter can be assessed in terms of the former.

Many projects of pastoral development aim to break the cycle of stock movement, both in terms of herd movement and stock transfers. One means to this end has been the delineation of pasture rights for individuals, who assume juridical responsibility for their region. When stock movement continues, development personnel often attribute it to individual intransigence. They seem to forget the rational basis for stock movements in areas of unpredictable and sporadic rainfall and the economic functions of exchange and transfer as a means of insurance or security (Dahl and Hjort 1979; Schneider 1979).

Another stated objective of privatization of land rights has been to enable individuals or groups to use land as collateral for credit. Credit is seen as crucial for economic change, and the assumption is that collateral will be used to procure credit for the crucial economic inputs to modernize the livestock industry. It is also assumed that the value of credit is appreciated by those with the obligation to repay it and that land serves as practical collateral. In actual fact, land often cannot be practically confiscated (Davis 1970; Heyer et al. 1976).

The link between organization and output is often questionable, though assumed by organizational theory. In part, the problem may be that the planners focus on legal relationships rather than on the dynamic, human situations in which organizations are continually produced. A single legal structure may produce very different outcomes in different contexts. Or, conversely, two organizational forms may appear jurally distinct, but be practically similar, the technical names hiding fundamental similarities.

A mechanical model of autonomous institutions that are purported to cause behavioural changes may place great emphasis on precise definition of organizational forms in the attempt to provide a means for prediction and anticipation. However, the gap between juridical definition and the organizational issue may be great, and the range of variation both within a specific scheme and between schemes of the same technical form may be great. I suggest that overemphasis on the theoretical scheme, or the juridical dimension, often serves only those who would affix blame for inevitable failures. To analyze the operation of organizations and human responses, one needs a more flexible concept of organization — one that draws the boundaries of a system where they appear and accounts for contextual factors that impinge on the model.

Just as the ideologies of planners must be incorporated into the analytical framework if internal relationships are not to be confused with causal links, so the implicit or tacit aims of program implementers must also be considered. These may be indirectly expressed, may be institutionalized
into the program through subsidiary guidelines, or may be implemented through extraorganizational mechanisms.

The ranching association adopted by the Tanzanian government for the Maasai is an example of how the technical form of an organization can be influenced by the national ideological context. The government has acknowledged that one goal of the ranching association is to eliminate private ownership of animals, whereas this goal has been largely dismissed in a similar organization in neighbouring Kenya, which lacks the commitment to socialism. Also, the goal is less ambitious for the government in Tanzania where pastoralists are a much smaller minority of the population than in Kenya.

The group ranch in Kenya has been touted as a significant experiment, with implications for other pastoral areas in Africa. It has been proposed as the new building block of Maasai society and, through land registration, has established links between individuals and specific land tracts that may form the basis for political divisions of the future. However, because the group ranch is a democratic organization, its members may eliminate it, voting to subdivide and sell the land. Although this possibility is a tacit aim of many government planners and has been identified in a number of publications, it plays no role in the theoretical structure of the organization (Heyer et al. 1976). Maasai motives for adoption of the group ranch also may have less to do with the opportunity for economic development, as forms a component of group theory, than with the perceived need to gain unambiguous title to pasture (Galaty 1980). So with respect to the same organization, there are several different explicit goals regarding pastoral development as well as tacit aims by some planners and many Maasai to transform the land to private commercial production and individual tenure (Doherty 1979).

A conventional issue in the study of organizational innovation has been the compatibility between traditional institutions and those being imposed according to external models (Bennett 1979). I have elsewhere (Galaty forthcoming) opposed making the distinction between traditional and external organizations a pivotal point of theory. I suggest that the organization to be imposed should be contrasted with all other organizations operating within the area, as — regardless of their origin — these form the context within which the proposed organization will operate. Socioeconomic relationships between pastoralists that rest on subsistence-based stock raising form institutional networks. Stock partnerships, family and clan relations, age-based affiliations, and political—territorial identities may be more salient and meaningful institutions than is the novel organization, which often represents just an additional resource to be used through the other social institutions. For instance, in Kenya, Maasai family groups have been known to divide their members between several group ranches to diversify their holdings and provide for times of crisis. Clans are often the basis for factions within such ranches, and age determines a member’s degree of control over the ranch facilities. Far from nullifying or even superseding other institutions, the new forms of organization are moulded by them and, in turn, give them new senses and emphases.

Just as students of planned institutions cannot ignore traditional institutions — the former often being channeled into or running counter to the latter — they must also take note of contemporary institutions present in an area.
In this regard, they must incorporate in their analysis organizations that purport to organize a narrow domain of life, such as marketing cooperatives or credit unions, and organizations that claim to order, comprehensively, the lives of people, such as the group ranches. The two types of organization may compete and demand resources or investment in an equal fashion. When analyzing an organization that cuts across the totality of social life, one cannot focus only on what is considered the core economic aspects, for a subsidiary aspect may explain why some people do what they do. For example, an individual may remain associated with a marginally productive organization not because of economic benefits but because of social services.

Another dimension of organizational contexts that one must consider when analyzing an organization is how much it differs from those around it. For instance, one individual ranch among many cannot be assessed in the same terms as one individual ranch among several group ranches, for the latter may gain or lose simply because of its being different. An island ranch — perhaps of a commercial form — is in a fortunate position because it may draw on resources outside its perimeter and is seldom expected to provide resources to those around it. Many organizations such as grazing blocks, grazing associations, and commercial ranches operate upon favourable lands within a wider context of unspecified or noncommercial husbandry. Success must, in part, be seen as a product of asymmetrical relations, as such prototypes or isolated schemes benefit from favourable status and to that extent represent neither prototypes of general applicability, nor units of self-contained operation. In other words, meaningful study of single organizations is virtually impossible if fundamental relations with other organizations are ignored.

Likewise, one cannot assess an organizational prototype outside the context of its essential raw materials. The same organization may be found in widely divergent locations, with drastically different resources and potentials. If the essential ingredients are not available, the organization will not be viable. For example, incursion of dry-land agriculture from areas proximal to pastoral areas affects the resources available to pastoralists, as do the nature of the stock, the compatibility of animal types, the existing structure of herds, the presence of tsetse, etc. (Dahl and Hjort 1976). Such factors cannot be disregarded in assessments of the viability of pastoralism.

Schemes of pastoral development are often assessed in terms of herd offtake and marketed animals. Yet, these rates are not simply a product of the various innovations of ownership, credit, fattening, etc. but are fundamentally influenced by marketing opportunities, requirements of the herd and its reproduction, and pricing structures. As long as prices are kept artificially low for the benefit of urban inhabitants, stockholders cannot be faulted for retaining stock. However, many people accuse pastoralists of irrational nonuse of the market yet are indignant that pastoralists use unofficial marketing channels (Heyer et al. 1976).

All organizations operate within environments of natural, economic, and political content that radically influence the actions of the human beings within those organizations. To assess organizations of pastoralism, one cannot look at a narrow causal line between the theoretical organization and observed activities but must consider the systematic relationships that link organizations and various other parameters, often considered as external. Research cannot ignore basic factors that surround and inflect organizations.
Tacit aims of planners and program implementers, including the political and ideological context of the nation involved in the program, the organizational environment, the material inputs, and the various incentives that elicit outputs must all be incorporated into an analysis that attempts to assess the operation of an organization or the forms of behaviour being generated.

conclusions

Rather than pursuing a detailed case study or reviewing the literature on diverse schemes of pastoral development, I have attempted a conceptual outline of variables that bear on novel organizations, influencing the form they assume and importantly affecting the responses of pastoralists to them. In other words, my thesis is that the organization is not simply an independent variable and should be assessed in the light of other variables that influence it. This is not to say, however, that detailed studies of specific schemes, ranches, and cooperatives are not useful; on the contrary, such work is indispensable to the development of a ground of information and experience that will demonstrate, beyond the capabilities of theoretical plans, legislative guidelines, or ministry directives, just what these organizations represent. Rather, I am suggesting that the organization itself should not be the prevailing framework for research, for it is itself a product of actors with their own orientations, ideologies, and motivations. The study of development is not simply the study of responses to innovation by a group of local people, but a study of a critical interaction between at least two — and perhaps many more — groups, government planners, who have concepts and power, and pastoralists, who have an ongoing social and economic system in which is perceived certain flaws. Theorists who assume that the flaws in the indigenous system are virtually self-evident often forget that, to many, the flaws in modernization are also self-evident or, at least, demonstrable. Without adopting a stance that categorically asserts flaws, one can constructively view the development product as a dialectic of forces rather than a mechanical outcome (or failure of outcomes) of specific innovations.

In closing, I would like to make more explicit several issues that I feel bear directly on pastoral development and should not be ignored in studies of organizations of development:

- Ecological arguments are used widely against pastoral economic activities and constitute a potent weapon. Without devaluing the benefits of careful ecological study and controlled comparisons in illuminating the constraints of pastoral production, I suggest that many ecologically based arguments derive from ideology rather than scientific fact.
- Modernization theories are often predicated on assumptions of indigenous irrationality and the prescientific nature of local strategies and technologies. Thus, organizational innovations, the implications of which are little anticipated, are often designed to disrupt indigenous practices that are little understood. The relationship between those who accept such theories and those for whom the theories are espoused is based not on differences of knowledge but differences of power, which result in perceptions of target populations as generally incapable. Future organizations should construct and not destroy
economic structures of cooperation and technology. Kjekhshus (1977) has detailed the destructive results of modernization attempts during the colonial period in Tanzania.

• Rather than complementing each other, ecological and national development arguments may work against each other. For instance, the transformation of land important to dry-season pasturing into agricultural production has wide ramifications for the productivity of pastoralism, and it is the most dramatic problem facing many pastoral regions. Overstocking must be seen in this context — competition for land — with certain competitors wielding the political edge.

• The most potent criticism of pastoralists' practice has always been their alleged reluctance to sell cattle, even though the reluctance likely derives from the economic conditions under which marketing has taken place, including restrictions on livestock movement, quarantines, lack of marketing facilities, and low-price policies. Indeed, one can ask whether an entire panorama of issues, being met by diverse government programs and services, would be addressed by one single and central innovation: allowing the price of meat to rise to the level supported by demand.

Consideration of these issues as well as the variables previously discussed is necessary if development projects and organizations of pastoral and livestock production are to serve, in a compatible fashion, two fundamental goals: incorporating marginal land economies into the national framework through strengthening of the livestock production and marketing sectors without undermining local economies and the subsistence base of their populations and without producing dependency on central mechanisms (O'Keefe and Wisner 1977); and constructing resilient social units of social and economic organizations that recognize local technical and social achievements, encourage local initiative, ensure a degree of local economic and social autonomy, and avoid the development of inequality.

Social scientific research can play a constructive role by illuminating the complex relations between the larger society and pastoralists and by providing the perspective needed to refine plans and avoid the errors of narrow analysis or deduction of what should be the case but is not.

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discussion

Sandford: A number of questions arise from this and other papers and from discussion. First, what do we mean by “organizations of pastoral development?” Second, are they worth study? Third, are anthropologists actually interested in them?

People during this conference have not shown much interest in organizations of pastoral development, whereas papers that concentrated on the management of land use (Bourgeot) or animals (Dahl) evoked a lot of
interest. Is management of land and animals the same as "pastoral development?" Is the study of new institutions for pastoral development important? Or should we advise developers simply to hand over all possible functions to the existing institutions of pastoral society? Were this always initially desirable (which I doubt), are existing institutions able to adapt and meet new situations? Gharaibeh’s paper suggests they sometimes cannot, whereas Bourgeois’ paper, after a detailed exposition of how traditional land-use management works, simply suggests that the main initiating role in pastoral affairs should rest with a transhumant council, without indicating how such a council would articulate different ethnic or other interests.

In my opinion, the organization of pastoral development is an important subject with practical implications for development. Anthropologists should not only study but prescribe them; otherwise less well-qualified people will devise them. Whereas Sandford and Galaty’s positions on development organization seem far apart, this is mainly vocabulary. Galaty’s “organizational forms” (which Galaty suggests are not worth much attention) are not the same as Sandford’s “organizational forms” (which Sandford does think are important), but are equivalent to Sandford’s “institutional labels” (which Sandford does not think important). Both Sandford and Galaty emphasize identifying factors that affect the performance of organizations, although Galaty’s list tends to be all-inclusive and Sandford’s to be restricted.

Galaty: Generally I agree with Sandford that what I refer to as an “organizational form” resembles what he calls an “institutional label.” But I suggest that the initially obvious distinction becomes more complex when we consider that labels often mark blueprints for the programs of innovation that are introduced or imposed. What we might call an organizational form in Sandford’s sense (not a label but an actuality) is not simply a structure of relations that emerge from the social process within a given case but must include the dynamic between a formal scheme (often identified by the label) and the reinterpretations, adaptations, and subversive responses to it. The label, then, has an efficacy that we must understand and that is always modified and transformed. Thus the label or scheme is of consequence but never of sufficient consequence to describe adequately the organizational form or the actual dynamic institution that emerges. For example, the label of a group or a cooperative influences the directions of an organization that adopts that structure, but the label is always applied to groups that already possess a set of relations and live in social contexts that modify it.

A slightly different issue is whether organizations are worth investigating. I agree with Sandford that they are, but we perhaps differ as to which elements to investigate. Sandford has elsewhere advocated the study of formal systems, holding outside variables in abeyance as if everything is equal, as the best way to attain scientific grasp of complex systems. I agree. My suggested line is to scrutinize not everything at once (which results in the conclusion that everything is connected to everything else, and that reality is indeed complex), but the relation between a specific system and certain contextual variables. One cannot examine the relevance of an external variable to a system until the structure of the system is understood; one must study the cooperative as a system to understand how inputs and outputs affect its operation and perhaps alter its structure.

Willby: Why do developers want new pastoral organizations at all? The name is of little consequence and does not greatly affect the actual form. The
form has generally derived from common justification: first, as a vehicle for development inputs (investment in water, dips, fences, pasture improvements, etc.) aimed at increasing production from the area, that should be shared equitably by the stockowners; second, to absorb in a productive and socially acceptable way the reinvestment of the hoped-for profits (speakers having suggested that lack of investment opportunities is often a disincentive to livestock sales). Pastoral organizations also try to associate a recognizable group of people with a piece of land and a controllable number of animals.

Salzman: It is fine to suggest, as Willby has done, that responsible managers are required to operate development organizations, but who will ensure that they carry out the task responsibly? Is this not the hoary problem of who will guard the guardians? When people's interests are in the hands of someone else, this problem arises. It is a political problem that cannot be wished away in the name of efficiency.
Several characteristics mark Jordan's experience in the resettlement of its Bedouin population. The most important is the fact that the settlement was self-generated rather than enforced by government. In assessing whether the formal or informal processes have been more important, one cannot but conclude that the informal factors have been paramount. The Bedouins were lured to settlement, not forced. Government direct efforts, although important, were secondary to the other factors that acted, and continue to act, as attractions: contact through army service, education, proximity to urban life, and personal contact between the monarchy and other government agencies and tribal chiefs.

The combined effect of the formal and informal factors has reduced Jordan's Bedouin population drastically. In today's Jordan the Bedouin peoples constitute less than 7%; of these, few are tent-dwellers permanently. The Bedouins have adjusted to the new lifestyles. In fact, in many cases, they demanded change. Their demands on government ranged from a request for building roads to requests for clinics, schools, and social services centres. The proverbial Bedouin independence has been reduced, and some decision-makers at times remark about the increasing Bedouin demands.

Large parts of Jordan have always supported a sizable Bedouin population, and Ottoman archives since the 16th century substantiate this fact. Before the 1940s the tribes were, by and large, rather free in their movements, and raiding among them was common. Further, some of the tribes encroached on the settled areas and exacted from these the khawah, tribute paid by the weaker tribes or the fellaheen peasants.

The spread of the authority of the national government and the steady increase in law and order over the desert areas, coupled with successive government efforts at resettlement, education, and urbanization, caused Bedouin influence and power to wane, and many turned to other styles of life.

In Jordan, the army played a decisive role in reshaping the life of the Bedouins. Army recruitment of Bedouin youth started as early as the inception of the state in 1921. Since military or paramilitary traditions and mores were part of Bedouin tradition, the army became a major employer of the Bedouins, augmenting their meagre resources and teaching them new skills. More importantly, through the army's acting as a medium or as the transitory stage between nomadism and settlement, the Bedouins were slowly integrated into Jordan's society.
Their loyalty to the regime is still undoubted, and having become the backbone of the army and the state, they have defended the regime against serious upheavals and turmoil that have marked Jordan’s political scene since the 1950s.

By the early 1960s, sizable portions of the Bedouin population were already settled or in the process of settlement. Still in the process in transition, many maintained their *bait shair*, hair tent, next to a mud adobe or cement house, thus physically portraying the process of settlement from the primitive to the semimodern: nomadic to sedentary. Many became only part-time Bedouin, Bedouin for only certain seasons of the year. Their herds of camels almost completely disappeared, and the size of their sheep and goat herds was also substantially reduced.

To augment their income many turned to the army and in the process became less and less independent, later demanding government subsidies, jobs, and services. Government response was positive though not always sufficient; the previously dynamic economy of the *badiya* — the desert home of the Bedouins — with its interdependence with the rural and town economies deteriorated greatly.

Today’s Bedouins participate in Jordan society in a variety of ways. Many have left their original habitat looking for job opportunities in urban and industrial areas; some are employed by the government and occupy prominent positions in the army or the bureaucracy; others have adjusted to new lifestyles. Unfortunately very few Bedouins return to their original areas after receiving an education or after having served in the army or bureaucracy. The drain on human resources has been and continues to be the most important factor in the continued underdevelopment of the *badiya*.

Although the Bedouins constitute only a small percentage of the total population of Jordan (about 7%), they have continued to play a major role in its affairs. Not the least of their diverse roles is that they have given Jordan a certain attractive image, in addition to the acculturation process, whereby many Bedouin mores, traditions, and values have filtered throughout Jordanian society.

**the pacification of the tribes**

Since the establishment of the state, Jordanian authorities have worked hard and patiently to pacify and absorb the once fiercely independent tribes. In assessing how this was accomplished, one wonders at the depth and breadth of the success. Not only pacified, the tribes became and continued to be the mainstay and the backbone of the regime. The role played by King Abdullah (1921–51) was essential. His patience with the Bedouins and his courting and sensitivity to their needs, both physical and psychological, were incredible. Raised among the tribes in Saudi Arabia, as was the tradition of his family, he developed a fair amount of sympathy for, and empathy with, the Bedouins and their needs. Under his guidance and direction, the commander of the Jordanian army, J.B. Glubb, too, developed a technique for dealing with the Bedouins, slowly but surely acculturating them to a more disciplined life with a more sophisticated hierarchy and a central national authority. At first, the King, himself, was viewed as a super chief, a sheikh of sheikhs. King Abdullah, and throughout his reign King Hussein as well,courted that image, frequently visiting the tribes, consulting with the sheikhs.
or soliciting their help or advice whenever the occasion or the need arose. Honouring the tribes, their culture, mores, and also their sheikhs was a major method of absorbing the tribes into the national machinery; reference to Bedouin mores and values was another method. Extolled are the special traits of valor, generosity, open-mindedness, and loyalty of the Bedouins. Also, the central government granted some of the tribal sheikhs and their tribes monthly stipends, subsidies, and frequent favours. Slowly and hardly noticed even by the Bedouins themselves, the sheikhs and their families were tamed, institutionalized, and absorbed. In fact, they have become the most important supporters of the national government.

**bedouin settlement**

Bedouin settlement or resettlement in Jordan has followed a certain sequential pattern. To some degree, this pattern can be observed in many other countries of the Middle East, especially those that have neither followed nor attempted a compulsory Bedouin resettlement program.

For the Jordanian Bedouins, the pattern of transition from nomadism to settlement has been a first contact of now indeterminate origin with outside influences, a rethinking of one's position and appraisal of lifestyle, followed invariably by seminomadism or rather semisettlement and eventually by complete settlement or perhaps a loss to the forces of modernity. Throughout these stages, the Jordanian government has played a major role. Often the role is hardly noticeable. The building of a highway through a previously inaccessible area has a tremendous impact on the lifestyle and destiny of the people of that area. Neither the government nor the people needs to acknowledge this fact; both may welcome the new highway for different reasons. Yet, the fact remains that life in that area is never the same. A specific example of this phenomenon is the changing lifestyle of the Bedouins of the Wadi Araba region in South Jordan. Not only are the indigenous Bedouins coming in contact with outsiders and outside influences hitherto unknown to them, but, ironically, they have established a rapport with the Taiwanese contractors constructing the highway. A new highway creates demands. Not only are the people more accessible, but they demand services from the contractors and the government — services like better medicine, housing, and water supply.

It needs to be emphasized that the Jordan government has never attempted a compulsory resettlement program. Saying this is not to negate the governmental efforts directed toward Bedouin resettlement throughout Jordan — efforts that have had, in our opinion, more lasting, humane, and attractive results. These efforts included the construction of schools, rural highways, clinics, hospitals, piped water and electrical supplies, artesian wells, or even pools in remote areas; inclusion of Bedouin youth in the army; scholarships for some of the Bedouin students to study abroad; and finally the perpetuation through the mass media of the value and worth of the Bedouin culture, customs, and mores.

The contact between the Bedouins and the forces of modernity takes place in a variety of ways through the schools, the radio, the press, television, shrinking distances, cousins’ working in cities or coming home on leave from the army. The oral tradition has always been very strong in Jordan. News of importance and of economic, political, or social implications travels fast and
The point is that contact cannot help but be made with the news of the outside world and its developments. News of the fruits of education for the children, better health facilities, better dietary intake, better services is indeed very attractive.

laws and organizations

In 1936, the first law specifically dealing with tribal affairs in Jordan was enacted. This law stated that the commander of the army was responsible for "exercising control and supervision over all nomadic tribes through the observation of their movements and the determination of these movements," and he was empowered to "investigate any unlawful action a tribe or any member of a tribe might commit."

The law ostensibly was aimed at keeping a tight control over the tribes and bringing them closer to the mainstream of society. It was enforced to maintain peaceful coexistence among the tribes themselves, on the one hand, and between them and the villagers and authorities, on the other.

Though the law had profound effects on law and order in tribal and neighbouring territories, it was by no means the only factor. To be sure, other governmental actions and programs contributed, especially settlement schemes in the area and the provision of various public services.

The law, however, was repealed after 40 years. And, interestingly, the tribal sheikhs were loudest in objecting to its repeal on the grounds that the civil law, unlike the tribal law, did not incorporate Bedouin traditions, customs, and mores.

In 1972, the government established the Council of Tribal Sheikhs, which was composed of 12–15 heads of tribes. The council was entrusted with the tasks of recommending to authorities programs and actions concerning tribal affairs such as administration, justice, health, economics, agriculture, education, and social services. This tribal council was administered by an educated member of one of the largest clans in Jordan and was headed by Prince Muhammad, brother to King Hussein.

The idea underlying the establishment of the council was that tribal sheikhs were eminently qualified to assess Bedouin needs, and they were asked to suggest ways and means to fulfill the needs. However, the council was short-lived, dissolved in 1973. Several factors were responsible for the ill fate of the council. First, a few tribes were not represented in the council and hence took a negative attitude toward it. Second, the younger and more enlightened Bedouins felt that a council composed exclusively of Bedouins would ultimately isolate them from society. Finally, many Bedouins and others saw in the sheikhs a symbol of backwardness and self-interest. Many educated young Bedouins laid part of the blame for this state of affairs on the sheikhs. The position of the sheikhs has declined, and they no longer command the respect and loyalty that they once had.

The Bedouins of Jordan are represented in the political institutions of the country. Since the enactment of the 1928 Organic Law, the Bedouin tribes have been represented in the state machinery in the executive and legislative branches. The Bedouins were represented in the five legislative councils elected between 1928 and 1947. When a new constitution for Jordan was promulgated in 1947, an election law was enacted to provide for Bedouin representation in the new Parliament. The Elections Law of 1947
allocated two parliamentary seats to the Bedouins. In 1960 this law was amended to increase the number to three deputies. On the executive level, the Jordanian cabinet has almost always included one or more Bedouin members.

These developments were meant to offer the Bedouins some representation on the national scene and hence bring about their integration. Though the objectives have been partly achieved, the measures have had a negative effect on the tribes. Rivalry among tribes intensified for representation in government institutions; tribes not represented usually felt insulted and undermined. Tribal heads benefited at the expense of the other members of the tribe. They improved their material lot, educated their children at urban schools, and, probably, lost touch with their tribes. The sheikhs lost some, and in some cases most, of their credibility — a fact that caused a further weakening and at times a breakdown of the fabric of the tribal structure.

settlement schemes

In the early 1960s, government took a more active role in settling members of tribes. The efforts started with a pilot project in Jafr in the eastern desert and were accelerated in the 1970s within the framework of the national development plans. The settlement projects were designed along two lines: the first involved the construction of housing units and the second, irrigation systems for cultivating reclaimed land.

Housing projects were either totally or partially funded by the government and totaled about 10 with an average of 30 units each. Houses were either rented or distributed to beneficiaries who were all tribal members. Most projects had an on-site clinic, school, and a post office; a few had piped water; and all had access to clean drinking water. Houses were in parallel rows on both sides of unpaved paths. Each unit averaged 60 m and was composed of one or two rooms, a kitchen, and a toilet, and some had a small, walled-in yard.

Agricultural projects largely involved irrigated farming of reclaimed lands. Few projects, however, were owned by individuals, and few were used for tree cultivation. Completed and planned irrigation projects included about 15 schemes incorporating a total 15 000 dunums, or about 1500 ha. Underground water was pumped to reclaimed farms averaging 25 dunums (2.5 ha). In the final stage, projects were supposed to be turned over to government-sponsored cooperatives that were to operate and supervise the schemes under the direction of a committee comprising representatives of various government agencies and the beneficiaries.

The Ministry of Agriculture was principally responsible for the projects, cooperating when necessary with other agencies. The ministry determined the pattern of cultivation and the area allocated for each crop. In almost all cases, 40% of the area was cultivated with forage and 60% was devoted to grain and vegetables. The ministry, moreover, trained tenants in agricultural works and provided agricultural services, some without charge.

Potential tenants were selected from the tribes around the projects through a screening process. The tenants were required to work on the project as trainees for 2 years for a daily wage. After this initial training, the successful trainees were allowed to rent farm units (typically 25 dunums each) for another 3 years, after which they became eligible for equity. During
their tenancy, they received some ministry-provided extension services free but were charged for irrigation, mechanized services, and construction.

The housing schemes were based on the government's intention to settle members of tribes, and most of them should be viewed as having this single purpose. The blueprint for the projects, however, departed markedly from the traditional camping pattern where tents were sparsely pitched all over the landscape. Although the clustering of houses in a small area made the task of providing basic services much easier and cheaper, this represented a radical change from the Bedouin's revered freedom. Many settlements were constructed on traditional camping spots so that tribal members just moved from tents to concrete houses. But the housing units were not adequately designed and equipped to house the animals, and people kept the herd in tents near the scheme. Finally, the settlement projects apparently neglected the social and economic aspects of life and did not provide for a gathering ground and shops. Although improvements in design that incorporated more open space and that combined cost and efficiency considerations could have made the projects more attractive, in general, these projects were a considerable improvement over tents, enabling the population to benefit from on-site services that would otherwise have not been available.

Irrigation projects, either already implemented or still in the pipeline, will probably bring about settlement of 600 families (close to 4000 persons) on farm units of about 25 dunums each, a few with houses. These projects have been completely funded by the government, and it has been planned that some of the construction costs will be recovered from the tenants' agricultural income.

An objective evaluation of the irrigation schemes should, however, shed some light on the human and administrative problems. First, settlers, all of whom were selected from among local tribes, were excellent at herding but very poor at farming because of either lack of agricultural skills or dislike for the occupation. Highly sophisticated knowledge and experience were called for and the settlers possessed neither. Although tenants were closely supervised for about 5 years, the time was not sufficient for them to master the advanced agricultural techniques needed. Unfortunately, many settlers viewed the process as a net gain, and they evaded paying back project costs. There was ample evidence that farm units were neglected after the 5-year trial, and the signs of sand encroachment into the landholdings were abundant everywhere. Settlers had become so dependent on government help that they were totally lost when titles were transferred. The result was that the few hundred beneficiaries wound up on government welfare, for they were not herders any more than farmers. Graft was apparent in the choice of tenants, and some of the units were distributed to tenants who never served as trainees. Also, it proved difficult to recruit skilled labour, especially mechanics to serve in project areas, and, finally, at various stages of project development and implementation, as many as seven agencies were involved, too many to cooperate successfully.

conclusions

The Bedouins' development to date in Jordan has been charted by several forces, including urbanization. The traditional territory of many
Bedouin tribes was close to major urban centres, which expanded to incorporate these territories. Land prices skyrocketed, and the tribes were absorbed into urban life and its amenities. Education, moreover, contributed its share in enlightening the young Bedouins about alternatives and opportunities. The educated youths left the tribes to seek employment and often to bolster family income. The army absorbed a large number of Bedouin youths, providing them with a regular source of income and, in the process, institutionalizing them. Finally, government efforts at providing social services and installing resettlement schemes had their marked effects. The fruits of progress brought with them the loosening of tribal bonds and the weakening of the sheikhs' position. A new breed of leaders has emerged, who are educated and more aware of the Bedouin role in the national scene.

**discussion**

*Khogali:* This good paper gives rise to a number of important questions, the most important of which is: If most of the nomads are settled, how is the badiya land used at present? Also, how do nomads perceive living in a manufactured house? You may recall the ancient Arab poet who mentioned that a tent where ghosts live was better to him than a palace. And why is it unfortunate that educated nomads do not return to their nomadic areas?

*Gharaibeh:* First, there is some formal effort to regenerate the vegetation in some areas of the badiya, but this job is mostly left for nature. Second, the Bedouin wanted to move into modern houses to use the services provided. Many still maintained their tents but erected them close to the housing settlements to gain access to water. Third, I think the loss of educated people is unfortunate because the region should develop from within; development cannot come from without, and teachers should not have to come from the outside. Development cannot be sustained unless carried out by the local population. So the drain of educated people retards rural development.

*Marx:* From R. Antoun's *Jordanian Village*, we learn that another problem besets the Bedouin settlements: practically all the men serve many years in the army. When they retire to the village they cannot herd sheep because that has become the work of boys and girls. Therefore the flocks will not range far from the village, and the area around the village will soon be overgrazed. This will inevitably reduce the number of animals raised and may even mean the end of pastoralism. For men retiring from the army there will be little employment.

*Gharaibeh:* Men at certain ages are in short supply in the area. They have gone elsewhere for lack of job opportunities in the badiya. Thus the herd is entrusted to the very old, very young, and women, which makes a negative impact on the grazing grounds and the herd.

*Awogbade:* What is the average household number, and to what extent does the government consider the household developmental cycle of the Bedouin before opting to build them one- or two-bedroom houses?

*Gharaibeh:* The average number in the household is about six. Unfortunately, this aspect of Bedouin household development was not carefully
studied. Therefore, we found these people did not feel comfortable in their housing.

Salih: In favourable political and socioeconomic circumstances, do they have a choice either to settle or continue as Bedouin?

Gharaibeh: The Bedouin have decided to settle because of the spread of education. It is a small country, so all the rural areas are close to towns; many Bedouin have been recruited into the army. They settle because they consider that sedentary life is good, especially after the spread of urban values in the country.

Salih: What has happened to those who settle? Do they change their occupation to mixed farming, or do they get rid of their animals altogether? If the latter, how have they replaced their meat and milk? Do large-scale ranches develop?

Gharaibeh: Actually, there has been no replacement of pastoral functions, and the total number of animals is gradually decreasing. Ranches are owned by the elite, and nearly all the country's meat is imported.

Marx: It appears that the settlements for the Bedouin in the rural areas were not successful. However, the villages with integrated farms were probably a success. At least the Negev Bedouin would like to live in such villages.

Gharaibeh: The housing projects were successful only if we look at them as points for the provision of services. Meanwhile, the irrigation projects are viewed differently. They are production centres and are supposed to provide an income sufficient for the Bedouin to live on. In that sense, they are self-sustained schemes and appear to be more attractive.

Ole Kishoiyian: Could the decline of the numbers of Jordanian Bedouin have been caused either by external pressures, by neighbours in the same nation, or by the government or other agencies for anthropological reasons?

Gharaibeh: The decline in number was due to several factors. Paramount among them was economics. The prolonged drought in that area diminished considerably the economic base. In addition, the provision of various government services prompted the Bedouin to settle. This limited their movement, and after a while some of them became identified with the rural population. So I think anthropology had little to do with this phenomenon, especially if one considers that the Bedouins are not ethnically different from the surrounding population.
sedentarization of the nomads: sudan

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Traditional communities in the countries of the Third World are experiencing rapid socioeconomic and political changes due mainly to the introduction and development of technology and learning and the desire of the political and planning establishments to achieve a degree of socioeconomic upgrading and national unity. The nomads, the vast majority of whom live in parts of the dry and semidry lands of the developing countries, are exposed to various forces of change, and they are increasingly drawing attention of the politicians, planners, and scholars. To have a Commission on Nomadic Peoples in the International Union of Anthropological and Ethnological Sciences and to hold a conference such as this are evidence of the wide interest of many scholars on studies and the future of nomadism.

A number of important questions demand attention whenever the future of nomadism is under discussion. Among these are: Should the nomads be "developed," whether development is spontaneous or initiated? If yes, what is the best way for the nomads to become developed? And can a form of settlement be equated with development or can settlement be the first step in the direction of development for the nomads?

The answer to the first question should always be "yes" because communities everywhere, in the developed or in the developing countries, should be developing all the time (especially when forces of change are working). Failure to respond to change leads to fossilization and death. The controversy is not over whether to develop or not but rather what sort of development should take place and whether or not nomadism is incompatible with development. It is on these points that scholars' views differ.

I believe sedentarization of the nomads is the first step toward development. I am fully aware of the complexity of the process of development and of the many scholars of international fame who do not favour, indeed who are opposed to, the settlement of the nomads, especially those nomads of the semidesert and steppe lands.

Nomadism in this paper means both raising of animals for subsistence and maintaining wide spatial mobility of households in search of water and pasture. This definition implies that lodgings are not permanent and that they are mobile. I consider the permanency of lodgings the most important difference between nomads and other pastoral peoples. Accordingly, I have not considered the Nilotic pastoralists of the southern Sudan to be nomads; this approach is similar to that taken in the Sudan population censuses of 1956 and 1973 but contrasts with that of Davies (1966) and El-Arifi (1975).
The nomads of the Sudan fall into two broad categories: the Abbala and the Baggara. The first group live in the semidesert and the desert edge of the Sudan where the average annual rainfall is between 75 and 250 mm. The Abbala raise mainly camels, hence the name, which means camel people, although sheep, goats, and a few cattle are also raised. The best example of Abbala is the Kababish tribe, which was well studied by Talal Asad (1970). The Baggara live in the savanna zone where the average annual rainfall is between 500 and 850 mm. They raise bagar (cattle), but sheep and goats are also raised. A good example of Baggara is the Humr tribe, also well studied by Ian Cunnison (1966). The works of Asad and Cunnison are known to most students of nomadism; therefore, I have not gone into detail about these two groups and have only made reference to certain aspects of their lives.

The Federal Department of Statistics found in a 1973 population census of the Sudan that the total number of nomads was 1.6 million persons or about 10.6% of the population. The nomads raise almost all the camels and more than 75% of all the cattle and sheep in the country. From this wealth, they supply most of the beef and mutton consumed in the Sudan, and they contribute effectively to the export of live animals and meat to Libya, Egypt, and Saudi Arabia.

Nomadism in the Sudan is more than 2000 years old, but its wide spread took place with the coming of the Arabs to the Sudan, in particular after the 10th century. The practice has many admirers all over the world, and these include nomads as well as settled people. Nomadism, therefore, must have a number of merits. However, the percentage of the nomads to the total population in every country where nomadism has been practiced has continued to decline. This indicates that nomadism has disadvantages as well. Any evaluation must consider all the bright as well as the gloomy sides of nomadism. Terms such as merits and disadvantages are relative. What was considered a merit in the last century may not necessarily be considered so in the year 1980. Change occurs and affects the elements of production. The human resources, including the skills and technology available, change at a more rapid rate than do the natural resources, but nothing is static. The most important merits claimed by the supporters of nomadism are:

- Its rational use of resources and
- Its rotational use of resources (Asad 1964; Johnson 1968; El-Arifi 1975).

the rationale

The scholars who support the rationale behind nomadic use of resources cite mobility as the means to exploit the potentials of different ecological zones. Some of the areas the nomads utilize are marginal or are infested with biting flies. The nature of most of these areas makes their exploitation either difficult or impossible by other people. Through their mobility, the nomads are able to raise enough animals to feed themselves as well as to make a noticeable contribution to the national economy.

For example, the Kababish (representing the Abbala) use part of the poor savanna in May–June, the edges of the semidesert and desert in July–November when the rains fill the natural depressions and when there is green and new plant growth. This latter zone, because of the lack of water
during the dry season would be left unused by settled people. The Kababish also frequent the semidesert of the dars (home, hima) in November—June. Here water is obtained from semipermanent wells, hafirs (artificial depressions), and artificial lakes. In addition, these people move to the jizu areas in December—April. These are desert areas where some plants, called also jizu, appear with the onset of the cool season. As long as the animals feed on the jizu, they do not need water. It is thought that the use of the jizu would be impossible for people other than the nomads.

Similarly, the Humr (representing the Baggara) use the clay plains of Bahr el-Arab/Bahr el-Ghazal in December—May. But they leave the zone as soon as the rains start because the area becomes infested with biting flies. From May to October, they roam the goz (sandy areas) when the natural pools are filled with rainwater. Thus, the nomads, like primitive hunters, take the resources and the fruits of the resources as supplied by nature without trying to improve upon them. This fact is apparent in the water and grazing the nomads exploit and in the quality of animals they produce. They depend heavily on natural pools. When other sources of water, such as deep wells or hafirs are available, they use them, but they do not dig or maintain such water points. Furthermore, they have not developed the art of collecting, storing, or spreading water. Likewise, they have made no improvement in the grazing resources. In fact, some of the palatable species have disappeared from their natural habitats and have been replaced by less palatable or totally unpalatable species.

The quality of animals the nomads produce is influenced by two factors: the continuous movements, which produce muscular animals that cannot compete favourably on the international market, and the efforts to increase the total numbers of animals rather than to maximize offtake. Why do the nomads not, as a rule, go for improvement of animals within the indigenous types they raise, by selective breeding and gradually getting rid of the weak animals? The nomads' need for cash is limited because of what they consume, and the amount can be obtained directly from their animals. Nomadism is basically a subsistence economy, and the nomads do not think of inputs for the sake of improvement — a basic feature of a commercial economy. The reasons that the nomads have not made improvements on water and grazing resources are all closely related to mobility. Talal Asad (1964) in defence of the nomads wrote: "... if the Kababish do not actively contribute to the improvement of their natural resource it is for the simple reason that they have neither the skill nor the means to do so — no more than the traders in Kordofan have for improving the roads they use.” The skills that Asad referred to can be acquired; and at first glance it seems strange that the nomads throughout their long history have not developed skills such as those needed for collecting and storing of water, while these have been developed by the sedentary populations with whom the nomads come into contact. The strategy of mobility instead of improvements is the basic reason that the nomads have not acquired the necessary skills. This is also one reason that the nomads do not accept willingly formal education. The lack of the means to improve upon the resources is a valid reason. Many of the improvements in water supplies (for example, digging of wells, and hafirs) need large and organized groups to construct, maintain, and protect them. But the nomads do not have such social and political organizations. They are continually dealing with new neighbours and allies. Asad's analogy
with the traders of Kordofan is unfortunate because the traders consider themselves part of an established government that does things on their behalf, whereas the nomads accept the government because it is imposed on them and not because they want it.

The nomads' mobility means also that they have no attachment to a particular locality. It is true that they have their dars and sometimes fight to defend their homes, but a dar is communally owned, and the use of resources is also communal. Why should a household or an individual take the trouble to dig a well or improve the grazing of an area that will be exploited by others?

grazing

Nomadism involves seasonal rotation in the use of grazing; it is a means of avoiding destruction of the plant cover and deterioration in the soil. Grazing all year in the same locale, however, is not the only source of overgrazing. Overstocking, even if accompanied by rotational use, contributes to overgrazing. In the past, there was an equilibrium between the numbers of animals and the grazing resources. When the number of animals increased beyond the capability of grazing to support the animals, nature interfered and led to the reduction of the herds and flocks. This pattern has changed as a result of increased availability of water, the government having established new water points in several areas, and the introduction of veterinary services, though on a limited scale. These innovations have their impact on the numbers of animals. The total animal units owned by the Kababish, for example, increased from 255,951 in 1953–54 to 627,826 in 1969. For the Sudan, the increase was from 2,778,000 in 1924 to 20,916,000 in 1974 (Ministry of Finance 1976).

The result of this increase was overgrazing on a wide scale in all the nomadic areas of the Sudan. Overgrazing implies reduction in the grazing potential because it reduces the intensity of the plant cover and leads to the disappearance from their natural habitat of some of the good grazing species. It was documented as early as 1955 by Harrison. One consequence of overgrazing was that each of the various nomadic tribes began to try to enlarge its grazing grounds at the expense of cultivators as well as other nomads. Many of the Abbala (Kababish and others) now regularly visit areas in the savanna zone that they did not visit before. The Baggara (Humr and others) are also trying to push to lands of cultivators on the goz as well as to lands of the Nilotics, who in turn are trying to do the same thing. This phenomenon is not confined to the Sudan but is observed in Syria, for example, where animals are trucked into lands previously out of reach (Lancaster 1980). The repercussions of such encroachment have been catastrophic in the Sudan. Recently, bloodshed, especially in the areas of Southern Kordofan and Southern Darfur, has become a fact of life. It would be useless to try to limit each nomadic tribe to its dar or to regulate tribal grazing rights, for as long as the animals do not find enough grazing in their dars the nomads will take them to the dars of other tribes.

In other words, what are considered merits of nomadism have their limitations and drawbacks. There are essentially three main disadvantages of nomadism: wastage in the use of human resources, incompatibility with the use of social services, and inability to absorb natural increases in human populations.
human resources

The distribution of work between the wet and dry seasons is uneven in nomadism. During the wet season, water and grazing are plentiful and the amount of labour needed is low. Animals graze and get water near the camp sites; supervision is all that is needed. As the dry season advances, more and more personnel are needed to draw water, to build earth basins, and to supervise the herds grazing at a distance from the camp. All the labour available is used, and in certain cases the available labour is not enough.

As a result of construction of dams, hafirs, and wells since the end of the Second World War, more water has become available during the dry season, and in some areas the labour requirement has been substantially reduced. The freed labour has been employed in different activities according to the social and physical environments. Many of the Baggaras, living in humid areas, began to work in agriculture, and some, from tribes such as the Humr, began to migrate to urban areas. But it should be remembered that the work of raising animals and of cultivation is done by members of the same family. In the semidesert areas where cultivation is not greatly rewarding, the freed labour was absorbed in raising more animals. So in addition to camels and sheep, goats and cattle were also raised. In 1969, the Kababish, reputed as camel owners, had a total 642,942 sheep, 255,951 camels, 64,184 goats, and 126,045 cattle. This diversification has also been noted to a lesser extent in the savanna zone. Had it not been for this surplus in labour, it would not have been possible for the households to raise herds of different animals, each with different grazing and watering habits.

The diversification has some advantages and limitations as well. Raising different animals means spreading the risk of natural calamities. Moreover, the different types — camels, sheep, goats, and cattle — have different grazing habits and preferences. Sheep and cattle graze, but goats and camels browse as well as graze. Thus, camels and goats are able to use the leaves of trees, and both can use very poor types of vegetation. Raising of cattle in the semidesert and under nomadic conditions has largely proved unprofitable because many perished during the Sahelian drought.

Thus, nomadism in its original form and as practiced at present entails disguised unemployment during the wet season. With the improvement in availability of water, this unemployment has spread to the dry season as well. The nomads have tried to use the surplus labour in other activities, including diversification of animals. This fact indicates that nomadism is capable of adapting to some changing situations; yet one should remember that some of the activities, such as cultivation, are not really directly related to nomadism and, in the long run, probably lead to full settlement. As more water points come into being and when labour-saving means (such as horses, dogs, cars, radios) are introduced into herding, more people will be freed from tasks related to nomadism.

social services

The provision of social services is considered an integral part of the tasks of modern government. Most countries of the Third World are poor and do not have the financial resources to provide services on a large scale. Yet, in trying to achieve a degree of modernization, they do provide some services.
The Sudan is no exception, but the nomads are unable to make full use of these services.

For example, they do not like to send their children to schools. More than 90% of the nomads of the Sudan have never gone to school; the figure for women is greater than 98%. Many scholars think that the reason is the mobility of the nomads, and therefore they suggest as a solution, mobile schools. I believe that the failure to attend schools cannot be satisfactorily explained by continual mobility. For one thing, children are an important part of the labour force. At about 8 years, they start to perform useful work, mainly in supervising the herds. Supervising smaller animals near camp sites is an easy activity, and this is usually entrusted to children and old women. As children grow, they attend larger animals, and when they reach maturity they look after camels. Respected persons do not shepherd unless they are forced to by need. If they have no other work to do, they prefer to chat with others and leave the supervision of the herd to children. In addition, the nomads feel that education makes children, especially girls and women, soft and, to some extent, rebellious because many of the educated children do not like to continue as nomads and often reject the values common in the nomadic communities. Furthermore, education has little practical appeal to them because it does not focus on nomadism.

Against this background of attitudes, mobile schools are not the answer. Besides, they have their own problems that make them impracticable. In a country like the Sudan where distances are long and roads are poor, mobile schools become extremely expensive, and staffing is a great problem. A few young, qualified teachers may find the idea romantic at first, but most drop out when they marry and settle down. I found this to be the case during visits to schools in Dar Humr, Dar Rezeigat, and Dar Kababish between 1975 and 1978. The few nomads who receive an education and become teachers refuse to work in nomadic areas even if the schools are stationary. Most of the teachers in nomadic areas are at present from settled families, mainly from the Nile Valley and the Gezira area. The majority feel the difference between their cultural background and that of their students. They accept work in such areas either because they are compelled by current regulations in the Ministry of Education or because they feel it is their patriotic duty. In either case, however, they feel that serving a few years in such areas is enough.

To overcome the objection of the nomads that, currently, education does not focus on nomadism, some scholars suggest that the curricula in nomadic schools be geared toward nomadism. The difference would be primarily in the application and in the details rather than in the basic content. I believe that education is not accepted by the nomads because it is a force of change and may lead to settlement, a possibility borne out by those who have education.

The picture for health services is similar. Some scholars are satisfied with the health of the nomads (Barth 1964); however, my experience with the nomads has been that they suffer from many diseases, although the distribution of diseases varies. The Baggara, living in humid conditions, suffer from malaria, schistosomiasis, and many of the gastrointestinal diseases. The Abbala who live in drier areas, suffer mainly from anemia, avitaminoses, and tuberculosis, although they also suffer from malaria and gastrointestinal diseases.
Mobile hospitals have been prescribed, but they are plagued by the same problems associated with mobile schools — excessive cost, difficulties in transport, and staffing problems. At any rate, the existence of hospitals would not eliminate the health problems, which are environment-related. They live under unhygienic conditions:

- They drink and wash in the pools that are used by the livestock and wild animals; the pools are a good breeding ground for mosquitoes and are a source of many water-borne diseases, especially in the savanna areas where pools remain filled with water even during part of the dry season;
- Animal and human wastes are everywhere, providing good breeding grounds for flies, and to a visitor of nomadic areas flies are in particular a noticeable nuisance;
- The diet of the nomads is generally unbalanced, the nomads of the semidesert suffering most. The shortage of food and the unbalanced diet are a particular problem for the Beja or the Red Sea region of the Sudan.

Although the living conditions of the settled populations, including many urban dwellers in the Sudan, are not vastly better than those of the nomads, improvements are much more feasible in the settled areas than in the nomadic areas. Treating the pools or draining them means depriving the nomads of their main water source. Asking them to use boreholes is unrealistic if they have to travel long distances to reach the water sources.

The natural increase of the nomadic peoples varies from one group to another. The rate of increase is high, between 2% and 3%, although it is not necessarily higher than that of many of the settled peoples. The Kababish tribe, for example, increased from about 140 000 in 1956 to about 200 000 in 1973, an annual increase of more than 3%. But the density of populations in nomadic areas, especially those in the semidesert, should always remain low even if intensification in the land use is made possible. Because the animal-carrying capacity under nomadism is limited and cannot be greatly increased, the options for the nomads are to move out of the area and settle (otherwise the problem will be exported to other nomadic areas); or to remain nomads in their own area and maintain the same average number of animals as at present. This means the land must accommodate more animals. This in turn leads to overgrazing. The last option is to remain in their own area but maintain fewer animals so that the total number of animals in the region is constant. This means reducing the average animal earnings of each nomadic household.

Advocating reduction in human fertility at this point of cultural development of the nomads is out of the question. The only reasonable course open to the nomads is the first system. But for the nomads to go to other regions and compete for jobs while they are unqualified is not acceptable. For instance, many of the Humr who have gone to Khartoum have been forced to work as house guards, and the Beja who have gone to Port Sudan work as porters. Educating the nomads is therefore important, and education is a force for settlement. I believe that settlement is desirable so that more intensive use may be made of both the human and the physical resources and so that the nomads can make more use of social services. The question is whether the nomads will accept settlement.

I think they will because many of the nomads are already abandoning nomadism and many are asking to be settled. The problem, however, is that
the nomads do not know what will happen to their animals if they settle. This problem does not concern the nomads alone. Animal raising is an important strategy for both cultivators and nomads in the dry and semidry lands. Livestock is a safeguard against climatic fluctuations. Naturally, the nomads, because they own more animals and they depend more on them than cultivators, are more concerned with the future of their animal wealth. Some advocates of settlement have committed and still are committing a grave mistake of calling for the nomads to become cultivators without animals.

settlement

Nomadism has gone through a number of phases. During the first half of this century, nomadism was strengthened and reached its climax. But as important agricultural development schemes, mainly the Gezira and the White Nile pump schemes, came into being, and, as towns expanded and railway lines were constructed, some nomads began spontaneous settlement. Thus, almost all the seminomads of the Gezira and the White Nile regions settled. Many of the Beja nomads also settled in Port Sudan, Tokar, and Kassala.

The most important change, however, occurred after the Second World War. Gradually, many nomads in Western Sudan began to settle as a result of a number of innovations, none of which was meant to lead to settlement. The most important of these were initiation of a program of construction of water yards, improvements in the transport system, growth of markets, and introduction of some social services.

In 1948, the Sudan government started a program for excavating *hafirs* and drilling boreholes in the dry and semidry zone of the country. Emphasis was given to the savanna region west of the White Nile. The aim of the program was to delay the nomads from going to their summer grazing in the south by about 2 months so that the grazing would last the summer. In the 1960s, the goal was modified to contain the nomadic movements with a view to future settlements. Between 1948 and 1977, 318 boreholes and 47 *hafirs* were opened in more than 260 localities in Southern Dar Fur alone.

The effect of this program in the savanna region was enormous. Many of the Baggara, especially the Rezeigat, Habbaniya, and Taalisha (all in Southern Dar Fur) took advantage of the availability of water in certain locales and began to settle and cultivate. At first, cultivation was for subsistence, but at a later stage groundnut production began to be important and came to have an impact on the settlement. The settlement was gradual and, at first, was only in the form of groups’ staying longer periods before and after cultivation in one locale. Some members from each household came early and prepared the land for cultivation. The desire to sell the groundnuts at a time when prices were high made it necessary for some members of the household to remain behind while the rest moved on. Later, several members of a household stayed permanently near the water points and cultivated while the others moved north and south with the animals. Cultivation began to look more respectable, and therefore it was the heads of the households with their spouses who settled while the young adults moved after the livestock. This became the pattern. But the division was not complete, the leader of the family usually looking after both activities.
Most of the Rezeigat families still follow this pattern. However, the nomads who have large numbers of livestock do not have the labour resources to do the two activities; those who are unwilling to hire shepherds have not settled.

The Rezeigat tribe, one of the most nomadic tribes of the Sudan till 1940, started this process of settlement. The tribe had experienced a serious shortage of grain during the Second World War, and the leader encouraged cultivation as an alternative to being at the mercy of tribes that produced grains. In contrast, the leader of the Humr tribe continued till the 1960s to discourage cultivation.

Improvements in the transport system were another factor that helped settlement. Lorry transport started to make an impact in the early 1930s. Better lorries were imported after the Second World War, and these became the backbone of the transport system in the western part of the country. At present, lorries connect all villages and towns of the Sudan. In addition, railway lines were constructed, and these now traverse important nomadic areas. The Nyala railway (1962) serves the Humr, Rezeigat, and Habbaniya lands, whereas the Wau railway (1964) crosses the Humr country from north to south.

Although the transport system has limitations, being inadequate and inefficient, it served well the commercial production and consequently played a role in the settlement that has taken place.

The development of commercial production also encouraged settlement through the establishment of organized markets. Among the features of each market is an enclosure where there is a government scale. Crops are auctioned, but producers may sell or withdraw their contributions if prices are low. In markets along the railway line such as Ed-Daen, minimum prices for the main commercial crops are declared at the beginning of the season.

To take Dar Rezeigat as an example, one finds that in 1945 there was not a single market for the whole area. By 1963, there were 13 markets, and at present more than 20 markets serve the area. Such markets ensure producers that their crops are sold the proper way.

The introduction of social services also promoted settlement. Primary and intermediate schools, hospitals, dispensaries, and primary care centres were much more accessible to settled populations.

For all these reasons, settlement on a large scale took place in the savanna zone of Western Sudan. In 1948, Dar Rezeigat, for example, had no villages, only camp sites. At present, there are more than 20 villages and one important town, Ed-Daen, and the percentage of settlers to the total population is more than 60.

Some settlement has also taken place among the Abbala of the semidesert; but, because of the limited options available, settlement is still on a limited scale.

Spontaneous settlement occurred in response to changes in the environment of the nomads. In the 1960s, the government introduced some schemes aimed at more rapid settlement. In 1964, the government started allotting tenancies to the nomads of the Butana in the Khashmel Girba Scheme; this scheme was developed for the settlement of the Nubians of Wadi Halfa whose land was submerged by water because of the High Dam. At present, of the 20,614 total tenants of the scheme, more than 11,000 tenants were originally nomads, and in fact not all of them have abandoned
nomadism. Almost all of them still keep animals, and at the beginning of the rainy season many leave their tenancies in the care of relatives. Some give the tenancies to other people to cultivate in return for a fixed amount of money or percentage of the crop. The two reasons for this behaviour are that the authorities of the scheme do not allow animals except between April and June after the cotton crop has been picked, and the cultivation of cotton, which is considered by the authorities as the main activity, is not rewarding. Thus, the tenants put the interest of their animals before the interest of the scheme. In addition to cotton, groundnuts and wheat are cultivated, and only the groundnuts are profitable to the tenants.

In 1968, the government decided to establish schemes that were directed toward settling the nomads. Thus five schemes, one in the area of the Kababish and four in the area of the Humr, were established. The Kababish scheme is a ranch with an area of 200 km². The economy of the ranch is based on livestock and millet and vegetables. The ranch is supposed to accommodate 50 families and their animals.

In 11 years, the ranch has never shown good signs of success. The reasons are many, but two important ones can be singled out. First, the ranch was established in the area of a minority tribe within Dar Kababish, but the area of the ranch is part of the communal grazing area for the whole Kababish tribe. So tribal conflicts occurred. Second, the ranch can accommodate only about 1000 animals, whereas the 50 families who are supposed to be members own about 13 000 animals. Thus only cattle are allowed on the ranch during the dry season, camels and sheep grazing outside the ranch the whole year. In other words, the ranch can be considered a fattening area for the privileged members and did not encourage settlement.

The question prompted by the ranching scheme is how many km² are needed to accommodate the total 30 000 Kababish families when 200 km² were insufficient for 50 families. A simple calculation shows that Dar Kababish has to be enlarged several times to accommodate its population.

The four Humr ranches were established in the area of Muglad-Babanousa. Each of these ranches, with an area of 100 km, was supposed to accommodate 50 families, to raise animals and to cultivate millet and vegetables. These ranches faced many problems and thus failed. They were established across the migration routes of other nomads, and the families that were supposed to settle on them owned more animals than the capacity of the ranches.

the future of nomadism

Nomadism is at a crossroads. Many forces are working in the direction of settlement. Modern means of transport are breaking the isolation of the nomads and bringing them in contact with other cultures and under government control. The nomads are making use of some modern technology in their daily life, and many of them are feeling that nomadism is no longer a respectable way of life as it was during the colonial period. Education, although still opposed, is attracting some nomads. Politicians, administrators, planners, and some scholars think that nomadism has no future. Also, many nomads from the Abbala and Baggara are in favour of settling down. There are examples of many nomads from the semidesert and
the savanna regions who willingly settled when they were sufficiently motivated to do so. More than half the Rezeigat tribe of Southern Dar Fur settled, although their settlement is partial. In 1978, the camel Rezeigat (of Northern Dar Fur) requested that the governor of their province encourage the government to take the necessary steps to settle them. I visited this tribe in March 1980 and found that their desire to settle was genuine. It is true, however, that some nomads object to settlement, perhaps not because they love the life of wandering but rather because they think that they will lose their animals and be turned into cultivators.

In contrast to spontaneous settlement that has taken place on a large scale and has proved to be successful, the government schemes for settling nomads have not succeeded. Spontaneous settlement is an adaptation to changes in the environment. The savanna nomads responded to the improvements in the availability of water by spending longer periods around the water yards to cultivate. As more stimuli were introduced, partial settlement developed. I think that the main reason for the comparative or absolute failure of settlement is the differences in the perceptions of the planners and of the nomads. Many of the planners think in terms of changing the nomads to cultivators without animals, but in financial terms nomadism is often more profitable than cultivation. My fieldwork in 1975–78 showed that the average annual returns to a nomad in the savanna region exceed those to a traditional cultivator in the same region by at least 30–35%. In the semidesert the difference is more than 50%. In contrast to the planners, the nomads view settlement as a process that should enable them to have more fodder and water for their animals or more financial returns in addition to some social services and peace and security. If settlement does not fulfill these expectations, the nomads will not settle.

I agree with the nomads. For this reason, I advocate changing the nature of nomadism to one of transhumance where the households settle but animals move under the care of individuals. This change has already started where spontaneous settlement has taken place. What is needed is more stimuli in the form of more water points, more improvements in transport and market facilities, more social services, and work options so that more children and women settle. One reason that in the past the whole household used to move in the nomadic community was the lack of peace and security. If peace prevails, then there will be no reason for the entire family to move. In the dry season when the demand for labour is at its maximum, the household remains stationary around the water points and individuals move with the animals. What I advocate is that the households stay the year round in one place, i.e., around water points.

What benefit will such a change in the nature of nomadism bring? Many. First, a large percentage of the population will be able to make use of social services. Medical services will be provided, and people will be able to make use of them. Also people will use clean water and sanitation facilities. More children will go to schools. In addition to the usual benefits of education, many of those who receive education will emigrate and seek work outside the region, thus relieving population pressure. Those who remain at home will engage themselves in other activities. In the savanna region, people have already begun to cultivate, some have become traders, lorry drivers, and workers in markets, schools, and hospitals. In the semidesert, cottage industries may develop for local raw materials such as wool. This possibility in addition to other employment opportunities such as those in transport or
social services, will produce additional income. Surpluses in labour can be effectively absorbed. Later, when more watering points are available, the distances walked by the animals will be shortened and the people may even become more interested in the quality of the animals. The settlers may even start animal breeding, and a feed-lot industry may develop. All these changes lead to commercialization of pastoralism, and use of distant grazing continues.

The nomads have already started these changes; what is needed is to carry it further through increases in the infrastructure. Such inputs would ensure better results than high-cost settlement schemes that may suit planners but not many nomads.

research needed

Many nomadic groups have been well studied, mainly by anthropologists and a few geographers. More disciplines have to be drawn into the studies so that land use, socioeconomic, and political aspects can be investigated.

The most important research that is needed is how to make improvements in the life of the nomads, irrespective of whether the settlement strategy suggested here is accepted or not. Thus, how to make better use of resources is one important field of research. This should cover:

- The carrying capacities in different nomadic areas and how to raise these capacities;
- Water resources and how to make more use of them; in particular research is needed into what techniques can be developed to collect, store, and spread waters of rain and small water courses;
- In areas where cultivation is possible, the integration of animals with crop production (cultivation of crops that are profitable in themselves and that produce waste to be used by the livestock);
- Options that create a balance between depending on animals and deriving income from other sources;
- Education suitable for nomadic areas not only to serve the purposes within nomadic areas but also to qualify nomads who emigrate and seek work outside their region; and
- Integration of planning for the nomadic areas with national planning (e.g., marketing the products of the nomads, absorbing in settled activities the present and future population surpluses, etc.).

discussion

Ayele: You have talked about settling nomads. I think you said that nomads should be settled, if they want to. I have the opposite opinion. When nomads settle, they depend on grain, which implies their herds will build up as consumption of milk and meat is reduced. The grain surplus is then reinvested in livestock. So these mechanisms lead to range degradation and are not the solution for nomads at all.

Khogali: The desirability of settlement of nomads is based on, first, making better use of the physical and human resources. Settlement on proper lines will allow more intensive use of land and water resources. Cunnison and
Asad, and most if not all others in similar work, do not distinguish between physical and human resources. My paper stresses the neglected human resources. Second, proper settlement will reduce overgrazing. Third, settlement will allow more use of social services. Fourth, settlement will lead to restoration of peace and security, which has collapsed as a result of competition for grazing. If the herd builds up as a result of more consumption of milk by animals, while human beings depend on grains, the settled nomads will be richer. Range degradation is not likely because settlers everywhere tend to sell surplus animals more than do nomads.

Salzman: Your compromise between continued nomadism and pastoralism, on the one hand, and sedentary agriculture, on the other, may be the best solution. Indeed you indicate a large majority of the people themselves approve of it. But is offering one solution, which must be accepted or rejected, the best way to proceed? Why not offer alternative solutions, which might range from one extreme to the other, and let the people choose for themselves in the light of full advice about the pros and cons of each?

Khogali: One solution is not the best way. What I advocate calls for a number of options. The proper infrastructure will give the alternatives of continuing nomadism, changing to a settled life, or striking a balance: the household settles and uses social services, while the herd continues its movements. Indeed, some services (such as education and transport) that will be introduced or improved may encourage emigration, thus relieving population pressure. However, Professor Salzman may be right. Those who opt to remain as nomads (and as settled households that herd animals) should also be considered when development plans are initiated. Medical services, education, and improved water supplies, for example, should be extended to them, although this would be difficult for a country with scarce financial resources such as the Sudan.

A sort of disguised unemployment in nomadism has been brought about by the limited improvement of water supplies. Where settlement has occurred, women and children gain some freedom. Some children go to school but may help in agriculture — putting seeds in the ground, for instance, in the afternoons or during vacations that coincide with the rainy season when cultivation is done. Women have time to look after domestic work as well as after themselves. They may also help in agriculture. Settled women of nomadic origin look nicer and cleaner than nomadic women. This is because women in nomadic societies (here the reference is to Western Sudan, where most of the nomads are found) do all the domestic labour and much of the production work. A woman is the first person to get up in the morning and the last to go to bed.

Cultivation is a family business, and all the family takes part in it, each according to his or her abilities and spare time. So far, the prevailing culture does not encourage a woman to cultivate outside the family. A widow and her children can have their own plot; so far, there is no shortage of agricultural land in the nomadic areas of the Sudan, and a woman can cultivate as many acres as she wants.

Salzman: In discussing the health problems of nomads, you have pointed to such things as standing water. This is characteristic of humid regions but unusual in arid regions. Are there differences in health between the arid north of the Sudan and the humid south? My impression from arid regions is
that the climate, the low population density in the pastoral regions, and the nomadism that results in leaving refuse behind and enables people to avoid disease-ridden areas contribute substantially to good health.

Khogali: Yes, there are important differences. The savanna is a humid belt, and water may remain stagnant in pools for 9 or more months, whereas in the semidesert, such as that of the Kababish where the land is semilevel, water stays in pools for only 2–4 months. This standing water also creates health problems, though not as serious as in the savanna belt. On the other hand, in areas where there are significant slopes, such as in the Red Sea hills, water pools do not exist, and water-borne diseases are rare. Thus the incidence of water-borne diseases varies according to climate, the slope of the land, and the porous nature of the soil. But water-borne diseases are not the only diseases in nomadic areas. The nomads of the Red Sea hills do not suffer much from malaria or schistosomiasis, but they suffer from anemia and tuberculosis. The point about leaving refuse behind and avoiding disease-ridden areas should not be overstressed. It may be accurate where the density of animal and human populations is low; it is not in areas such as that of the Kababish where 200,000 persons and more than 1 million animal units exist on 125,000 km². Visitors to such areas are amazed by the amount of animal and human refuse and the numerous flies. I suspect the ill-health of nomads has been underestimated as a result of studies undertaken in hilly areas such as Iran and Afghanistan. The health of the nomads in humid or dry areas, in level or hilly areas, should be a priority for research, which should include also the role that the mobility of the nomads plays in spreading diseases.

Salih: Recent research has been directed toward immediate practical problems, and there is a changing trend from pure academic research to applied. Traditional postmortem research is no longer popular among social scientists; rather, today social scientists are associated closely with international agencies and national governments, and they are involved in feasibility studies, implementation, and project evaluation. However, contemporary social scientists occupy a more advantageous position than their predecessors. Today, they can contribute directly to the process of development and social change, their voices are heard, and their views are considered. But social scientists' objectivity can be brought under pressure from policymakers and the financial supporters of their research. Modern development research is characterized by a relatively short duration, and there is always pressure on the researcher to finish. I have noticed that in developing countries most of the development projects are based on quick surveys, and no actual research has been carried out. Finally, I want to say that most of these research projects are directed by policymakers, and this means that the research, from preparation to fieldwork, will be closely associated with the administrators, and the researcher has to comply with their advice, guidance, and interests.

Khogali: This may be true, but even if we as social scientists cannot be totally objective and independent, it is better to be involved fully in applied research than to avoid vital problems. This is because our intervention will minimize the damage that results from development programs. Development will be implemented whether we take part in it or not. Therefore, it is better to participate than to wait until a project proves a failure and then to criticize.
Anthropology has made a contribution to the development process, and it is right to ask about the views of nomads. However, the views of the nomads on sedentarization are not absent from my paper. The fact that many nomads, especially in the savanna, are accepting settlement is a particular example. What has been omitted from the paper is the detailed results of the surveys I carried out in the semidesert and savanna regions. The omission was intentional: I thought that the settlement that has already taken place would be sufficient evidence of the nomads' desires. In the Rezeigat and the Humr areas of the savanna, more than 80% of the nomads answered that they would settle if they found the facilities (water and grazing). However, almost all of them answered that they would continue to raise animals and would resist any attempt to deprive them of their herds. The remaining 17% or so said that they would like to settle, but they are fully aware that they would not find grazing for their animals if they did. When asked what benefits settlement would give, they always replied social services. Similar results, although with lower percentages, were obtained from the Kababish tribes (semidesert). Incidentally, I referred in my paper to the camel Rezeigat (in the semidesert), who requested that the government settle them, and during my visit I was convinced that the tribe's desire to settle is genuine.

Sali: This paper depends on two propositions: first, settlement is a step toward development; second, some of the nomads have already settled or have asked to settle. The first proposition depends on one's perception of development. Settlement and development do not necessarily coincide. The generalization is not valid, because one cannot be certain that settled people are more developed than pastoral nomads. The issue depends on what development is and how it is measured. A considerable number of pastoral nomads have already settled because they were forced by one factor or another to do so. The factors vary from political, economic, and ecological to administrative (that is, the desire to use social services). Furthermore, you emphasize the importance of settlement, because nomads are not using their environment fully, but you recognize that the nomads exploit their environment rationally. Thus, you seem to be blaming the nomads for not exploiting fully their natural habitat. I feel that there is a contradiction here; given the nomads' level of technology, they exploit their environment to the maximum, which is rational. If there is a waste of resources, it is not the nomads who are to be blamed but the planners who have not made improved technology available to them. More importantly, it is not necessary to provide this technology within a sedentary context. The technology can be provided within the pastoral context.

Furthermore, you use disguised unemployment in pastoral societies as an argument for settlement, saying that their excess labour can be absorbed in agriculture. On the contrary, all empirical evidence from the Baggara, Kababish, Rofaa el Hoi, and the Hadendowa attests to a constant labour shortage among pastoral groups. It is evident from all these societies that households must either form herding groups with other households or hire herders. However, if writers have recently found that there is spare labour among the nomads, this can be related to the fact that today there is more security within these societies. Herding no longer involves raiding and animal theft from neighbouring groups. Therefore, herding demands less labour as the herd does not need a number of herders to protect it. The division of labour among household members between agriculture and herding is not
something recent among such groups as the Baggara. Cunnison has shown this clearly in his study of the Humr. Lastly, I have to defend us anthropologists against your accusation that we oppose settlement. We are not against settlement per se. We are against enforced or unplanned settlement.

Khogali: Dr Hassan Salih has raised many points, and I will take them in order. First, development: without going to the trouble of defining it, I think it can be measured by how intensively a group uses its physical and human resources, and what returns the group gets from them. The nomads are using their physical and human resources in an extremely extensive way, although some intensification is possible if they supplied several inputs. Second, I am not aware of any compulsion in the spontaneous settlement in the Sudan. The Rezeigat and the Humr tribes are certainly using their resources, after settlement, better than in the past. I call such settlement a willful response to change in the environment, including provision of social services, and I believe more such change should be encouraged. Third, I do not go along with the concept of rationality mentioned in some of the anthropological and geographical studies. There are levels of rationality, and nomadism is, I think, at a low level, although a level higher than that of the primitive hunters and food gatherers. Fourth, the technology of collecting water, for example, is old; the nomads have not used it, not because they are subhuman or stupid, but because they opt for mobility, which is an integral part of nomadism. I do not blame the nomads, but I was demonstrating the disadvantages of nomadism; it is not possible to apply certain technology, such as collecting water or improving grazing, under nomadism. This is because land is owned communally and there are no settlements to guard improvements. Fifth, the fact that some families split, with one section going after the animals and the other section cultivating, without a decrease in the number of animals per household, indicates disguised unemployment. Otherwise, the development of cultivation on such a large scale in some of these nomadic areas would have been impossible. Your assertion that the Baggara, Kababish, and Rofaa el Hoi suffer labour shortages is not correct. How do you explain that so many of the Humr people (Baggara) work in greater Khartoum without adversely affecting the number of animals owned by their families? Or how do you explain that many of the adults of Rofaa el Hoi leave their animals in the dry season grazing area and go to work in mechanized crop-production schemes? To say that this spare labour could be a result of improvement of security is relevant and supports my idea. It indicates that improvement in the social services, including security, has important effects on the nomadic environment, and the nomads respond to that in different ways, of which the most important one is settlement.
Sedentarization of nomadic pastoralists and “pastoralization” of cultivators in Mali

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Pastoralists are sometimes defined as groups for whom pastoral activities (herding and caring for animals) account for more than 75% of working hours and provide more than 50% of total income. They are also defined as groups for whom milk and dairy products supply more than 20% of caloric intake (Swift 1979b).

Such definitions, if accepted, greatly increase the number of people considered pastoralists (between 4 and 5 million in West Africa — Swift 1979b) and remove any notion of purity of activity from the term. In other words, herders make their living by practicing some combination of three activities — husbandry, agriculture, and trade. Thus, although subsistence of the herd is the dominant concern of pastoral activity, the life or survival of the herders depends on their ability to deal with not only the bucolic realm but also the realms of agriculture (even if just in the exchange of products) and commerce (the introduction of animal products to the marketplace).

The pastoral economy of Africa in general and Mali in particular is thus linked to both an agricultural and a commercial economy; any study of the future of pastoralism in this region necessarily involves an examination of current interrelationships as well as a consideration of possible future interconnections. It is in this perspective that I shall attempt to trace the growing tendency among nomadic pastoralists to settle in one spot and among cultivators to turn to livestock rearing as a major occupation rather than merely a sideline.

Sedentarization

The mobility of herds

The primary concern of all peasants, whether cultivators or herders, African or otherwise, is to have a secure food supply. They pursue this goal within the cultural boundaries of their ethnic group, within the limits imposed by the topographic and climatic conditions, and with the aid of tactics designed not necessarily to eliminate obstacles but to allay the effects of obstacles or turn them to advantage. Whatever form these tactics take, they are essentially characterized by:

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1 This paper was originally French and was translated into English by IDRC for inclusion in these proceedings.
• The use of several types of animals;
• The existence of small animal and family units;
• An ecological rationality involving movement, the distances involved depending on the particular circumstances; and
• A dependence on agricultural communities.

These elements do not always appear together, and, when they do, they do not all have the same importance. Ecological grounds, which are often advanced as an explanation for the movement of nomads, do not always account for certain situations where the nomads or part of their herds remain in one place despite less-than-ideal living conditions.

The sedentarization of nomadic populations may be viewed as a movement within society, a continual process of social structure modification leading to dramatic change in the physical management of space as well as profound alterations in the customs and behaviour of social groups. The adoption of a sedentary lifestyle restricts the individual's social contacts to a physicosocial space, where the physical and social advantages of the open nomadic life must be relinquished. In other words, whereas nomadism is a free and natural way of life (the search for the natural conditions favourable to human life, wherever they be), sedentarization involves direct intervention by humans in the natural or ecological processes of a spatially restricted environment. Here, ecological conditions are not always adapted to; they are created — at the expense of certain social customs and sociological attitudes proper to nomadic life as well as certain features of the physical landscape. The proximity and the permanent nature of spatial occupancy that inevitably accompany settlement both alter and enrich the relationships of an individual with others.

The sedentarization of traditionally nomadic populations rarely takes place because of concern for them or because of ecological factors. Usually, it is merely the outcome of a particular social, historical, and economic situation rather than the result of concerted, studied action on the part of those involved. Sedentarization is a tactic adopted by the nomadic herder to overcome or make the best of a difficult situation. This is why the drought of 1973, while it led to a widespread migration of peoples toward supposedly better regions, also contributed to the settling of many who stayed to develop vacant land and make it agriculturally productive.

Although pastoralists view this conversion to agriculture as merely a temporary measure while they rebuild their decimated herds, their plans to return to herding seldom materialize. The phenomenon of sedentarization holds an important message in that it can be a symptom of, or a solution to, problems affecting nomadic society as well as a reflection of (among other things) deep-rooted social determinants.

It is most important to recognize in this process the determining factors that, through their effects on a given society, compel its members to renounce their former identity (as nomadic pastoralists) and adopt a different way of life. The most apparent determinant is ecology, and, though important, it is seldom sufficient and is not even essential. Other factors are economic and social.

Nomadic herders who settle despite ecological factors generally have two practices in common: they maintain the mobility of their animals and they abandon single-species breeding. This is the case with Fulani herders of the interior delta of the Niger, where the major part of the herd continues to migrate between the Sahel (of Mali and Mauritania) and the rich pastures of
the flood plains of the Niger River. Another practice taken up by settled nomads is cultivation, although their attitudes toward it vary widely. For instance, the Fulankiriabe in the Gourma often neglect their herds in favour of agricultural work, bothering only to water them in the dry season and to milk them.

The process of sedentarization, which occurs despite inhospitable or hostile living conditions as a result of social, economic, and historical factors beyond the control of the individuals or their group, takes place on two levels. The first concerns physical space: a group begins to settle basically in one location while its herds continue to wander over a fairly wide area. The second is sociological: the group adopts a new way of life and adapts by raising other species or by making the land productive agriculturally. The current preference among pastoral populations in general for small stock is likely related to the drought, because they require less food and water than do large animals and reproduce faster.

economic and social constraints

Sedentarization is based on, and presupposes, the agricultural development of land that may previously have been used for raising animals. In cases where these lands are already available, and there is no objection to their use for agricultural activities by another group claiming ownership, the availability of skilled labour is the only hurdle to be overcome. In a traditional, livestock-based system, labour needs are few, and an increase or decrease in the number of workers has little or no effect on yield. In agriculture, however, the situation is quite different, as the size of the work force has a direct impact on production.

The semisedentarization of Fulani pastoralists in the Macina was possible under the Dina empire because of the existence of organized slave labour. The beginning of sedentarization among the Fulankiriabe can be traced to the development of a wage system based on a migration of young people, during the rainy season, from flooded zones to the unflooded areas occupied by the Fulankiriabe.

Indeed, the slowness of the process of sedentarization noted at the turn of the century is not so much a consequence of reluctance on the part of nomadic populations to abandon their wide-open spaces (although this feeling may well exist) as it is an indication of their difficulty in grappling with certain social, economic, and technical problems that the transition to a sedentary life would inevitably raise. The nature of husbandry (which is extensive), the nomads' total reliance on family as a source of labour, their lack of familiarity with agricultural techniques — all these hinder sedentarization.

Agriculture is something new for pastoralists; very few Fulani in the Macina have plows, and none of the Fulankiriabe do. Instead, they must rely on the services of those who already own plows — and who will work for others only after their own work is finished. Thus, even though they sometimes have draft animals, they come to depend on agricultural communities for labour or equipment, the hiring of which demands a cash outlay. Their emphasis on raising livestock declines in favour of laying in a store of grain not because of sedentarization but rather because they are obliged to draw on a sporadic source of labour that requires payment in cash.
The major socioeconomic factor encouraging sedentarization of pastoralists in this part of Mali is the imbalance between population and available resources, the most important of which is land. Agricultural production requires a much smaller plot of land than does livestock production; this difference in yield between traditional agriculture and husbandry leads to an increase in agricultural activities to the detriment of pastoral activities when land becomes scarce. Years of drought and population growth reinforce this trend.

The sedentarization of the Fulani herders has not come in the wake of a political decision (as was the case with the semisedentarization of the Macina Fulani in Mali during the reign from 1818 to 1862 of Seku Ahmadu) but rather in response to the combined effects of the drought (leading to a staggering loss of livestock) and various economic, social, and legal changes that have occurred or seem likely to occur in the management of herds and pastureland. And experience has shown that a plot of ground put to agricultural use is a more profitable proposition over the short term than is a plot developed by or for pastoral use, given the same climatic conditions.

Two apparently contradictory trends characterize the rural society in this part of Mali: the transformation of nomadic herders into cultivators and the tendency for cultivators to become herder-farmers. In reality these two movements are complementary. Bridging the gap that exists or existed between cultivators and pastoralists is not a new concept per se; the impetus that motivates some to cultivate fields is the same as that which induces others to raise livestock — that is, the search for a socioeconomic balance that will result in a steady food supply. The approach used by both those involved in agricultural production and those involved in pastoral production is the same; they try as much as possible to minimize human intervention in the natural development of plant and animal species. Although these populations have devised solutions for many social, economic, and physical problems — a good example being the adoption of animal and plant species adapted to the harsh climatic conditions — the separation of cultivating and livestock-rearing activities does not provide for a comprehensive strategy to deal with natural disasters and current problems.

Moreover, herders in this region of Africa (Kai Tamacheq, Fulani, Moors) have always participated in agricultural activities through their domination over certain “servant” classes — specifically, the Bellah, Maccube, and Haratine — and accordingly benefited from the results of agricultural work. The “purely” agricultural workers, in turn, whether ex-slaves or members of other ethnic groups, have never been blind to the advantages of raising small stock (sheep and goats and beasts of burden such as donkeys and horses) to complement and support agricultural activities.

The seemingly new element lies in the fact that the current trend toward agropastoralism appears to be a general phenomenon occurring among both herders and cultivators and exceeding the limits of traditional agropastoralism, where the complementary nature of activities is usually apparent only as far as the exchange of commodities (milk-millet, manure-millet, and so on) is concerned. It is from this perspective that I shall examine cultivators’
increased interest in and respect for the traditional occupation of livestock raising.

Livestock, as a capital good, represent a much more secure investment than do crops, as the mobility of herds is in both the physical and the sociological sense (use of the system of loans that exists everywhere in one form or another, division of the herd to suit various geographical areas, and so on) and allows the owners to confront natural disasters with minimal disruption of their lives.

There are two reasons for the use of livestock as a long-range investment. First, grain fed to livestock promises greater profits than does stored grain; it not only improves the quality of existing animals but encourages long-term increases in herd size, whereas stored grain not only does not increase in weight (an upsurge in its value is merely a reflection of market speculation in poor seasons), but in fact depreciates in value after 3 years and becomes inedible. Alongside this crucial economic argument runs another significant one of a social order: to wit, there is social prestige, which can also be seen in monetary terms, in ownership of a sizable herd.

In their traditional form, pastoral activities (especially in relation to production) involve fewer people than do agricultural activities and result in a higher ratio of goods produced per unit of labour. This explains some of the popularity of husbandry within traditionally agricultural social strata.

Proof of this popularity can be seen in the massive investment in pastoral activities on the part of agriculturally based populations. Thus, besides the agricultural surplus, which is converted into money for buying livestock (perhaps just one or two goats), the cash flow generated by the rural exodus or siphoned from the wage or trade income of family members is often used to set up or increase the family herd. The alleged greediness of Fulani herd owners (payment in kind is usually limited to giving the labourers milk from the first calving, clothing them, and allowing them to keep a 1-2-year-old bull calf, depending on their length of service) or their alleged poor management of the animals in their care induces farmers to look after their own animals by releasing a member of their family from agricultural duties or by hiring a paid herder.

The use of hired workers entails client relations as well as class relations, an outcome of the quest for profit. Cost effectiveness did not figure among the preoccupations of the livestock breeder in former days, but it is coming to the fore now that the process of pastoral production is undergoing transformation. Instead of being content to rely on natural development (natural increase of the herd without control of breeding, use of natural grazing areas) herd owners prefer, for example, to raise oxen to rent out for farm work or transportation — in the Mopti area one breeder is reputed to have 200 pairs of oxen for rent. Some are now following the price levels in various markets so as to sell when prices are high and buy when they are low, rather than simply selling part of the herd as dictated by social needs such as marriages or baptisms.

What is most striking in this regard is the startling change in mentality among herders of the Central Niger Delta in Mali: pastoral activity, through its links with agriculture and trade, shows signs of turning into a form of agribusiness. The association between husbandry and agriculture may be at the root of this trend; the Rimaybe of Macina use plows and carts and rear bull calves from their herds to replace aging oxen.
Although, until recently, the association between husbandry and agriculture often appeared as an alliance between two distinct ethnic and social groups (primarily nomadic pastoralists and sedentary agriculturalists), it is now undergoing a transformation that means increasingly pronounced integration and intermingling of the two ways of life. The cultivator is finding it ever more necessary to be a herder and the herder, a cultivator.

A partial explanation, and perhaps a parallel, for these developments, which give rise to a readjustment in mentality within both production groups, can be found in changing soil and land-use characteristics. To meet the needs of an expanding population, farmers have expanded not only the amount of land under cultivation but also the cropping period. The result has been reduced soil fertility. At the same time, growing numbers of cattle and other livestock are concentrated within a shrinking amount of pasturable space, and the result is the deterioration of pastureland. The effects sharpen the long-standing conflict between users of agricultural space and users of pastoral space. In terms of principles, this conflict can be viewed as the struggle between two value systems: the concept of personal or family property, providing for limitations in space and time on the use of pastures, opposed to a system without private ownership that implicitly sanctions the destructive agricultural or pastoral development of land — in practice, the remodeling of the physical landscape through unregulated exploitation. The solution, which would commit both sides to an investment in management of land areas, consists in guaranteeing everyone some form of ownership, the sole criterion being that the land not be misused — in other words, ensuring all involved the use of the land and the yield therefrom on a lasting basis.

**conclusion**

The problems faced by herders, whether of a physical nature (decrease in the number of animals that can be accommodated, because of unprecedented growth in herds and the overgrazing of grasslands) or involving human factors (the refusal, for economic and social reasons, to thin herds by selling or slaughtering some “unneeded” animals), can be remedied through an intensification of agricultural and commercial activities. Headlong flight and other rash, often apparently irrational, reactions to natural disasters and certain market phenomena are characteristic of today’s herd owners, sedentary or nomadic. Deliberate, possibly concerted, efforts — such as organizing use of pasture — to encourage herders to settle in given locations would undoubtedly render traditional pastoral practices obsolete and would aid breeders to exploit the full potential of their herds.

The problems of stock raising include the opposition between pastureland and agricultural land, which takes on the appearance of a conflict between the traditional and modern use of space inasmuch as agriculture, encompassing flood control methods and new techniques such as plows and fertilizers, seems to be more advanced than does husbandry where even the use of feed supplements is not yet common. In the past, an association between those involved in stock rearing and those in agriculture resolved the conflict; however, today, an integration of pastoral activities with agricultural activities, and vice versa, may be the only solution.

The integration already taking place in the operation of development goes beyond the traditional association between husbandry and agriculture,
whereby different ethnic groups with divergent and even conflicting ways of life are simply juxtaposed in space and time. In true integration, investments in pastoral activities profit agriculture and those in agricultural activities benefit stock breeding. The current trend, if it continues, will inevitably lead to the demise of traditional pastoralism. In its place will emerge the rational development of herds and grazing land, which will include a reduction in the current livestock population as well as its confinement to relatively fixed areas. Better management of fewer animals is a response to the systematic theft of animals, known in the region as teréré or jula-base. Herders’ associations have been unsuccessful in attempts to curb this practice.

The disappearance of the traditional pastoralist will mean that herding will no longer be considered an ethnic specialization characterized by indisputable technical know-how and a certain mythical, esoteric knowledge; it will, instead, be recognized as an economic activity that, as such, is concerned with yield and profitability. For one to be able to speak of yield and profitability, the benefits obtained must surpass the strict marketing profits, based on the interplay of supply and demand, which prove illusory in the medium term.

discussion

Bourgeot: The presentation of Salmane Cissé is interesting, because he has described the actual situation in the Gourma. It confirms what Xavier de Planhol has called “sedentarization through impoverishment” of nomadic pastoralists. It further analyzes the conditions under which certain cultivators adopt herding. Ovines are being commercialized in increasing numbers, a tendency that rests on increasingly large monetary needs. Such needs are characteristic of the Tuareg but are even more salient among the Fulani of central Gourma, who began to herd ovines around 1973. The movement to sedentarization by the Fulankiriabe began a relationship with the Tuareg who dominated them by right of first arrival.
livestock development and range use in nigeria

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Perhaps no other subject is of more importance and, yet, riddled with more controversy, than the future of pastoral peoples. The controversy simply echoes the agricultural problems facing the Third World countries. It is so in Nigeria, particularly, where 70–80% of the population lives in rural areas and, moreover, depends upon either agriculture or animal husbandry for subsistence. Thus, these peoples’ understanding of rangeland uses and preservation for the future is a special concern.

For Nigeria, interest in livestock producers is especially timely for many reasons. Among them are:

• The continuous shortages in meat and other livestock products for the rapidly increasing population and the consequent increases in imported frozen meat and meat products;
• The much-discussed recent drought in the Sahel, which decimated livestock resources;
• The need for appropriate guidelines for use by government agencies engaged in livestock production and range management; and more importantly
• The increasing constraints facing livestock producers because of their tradition-bound production system.

There is no doubt in my mind that Nigeria cannot afford to remain indifferent to livestock producers’ problems.

Unfortunately, Nigeria, blessed with endowments of land, suitable climate, and human resources, is still among the Third World countries that are deficient in high-quality protein. For instance, per-person consumption of animal protein in Nigeria is only 15 g/d compared with the recommended 25 g. A significant proportion of this comes from domestic national herds, and the rest is imported.

Clearly, the government must try to improve the livestock sector — a sector that is dominated by traditional producers and is subject to the effects of drought, unscientific use of rangelands, and inadequate feed resources.

The problem facing Nigeria's agricultural systems is not that of insufficient endowments with which to stabilize the livestock and farming sectors; rather, it is that the policymakers are confronted with conflicting national priorities, that is, to improve production from farming and to expand cattle production areas. Economically, the two priorities are equally important and cannot be separated. The question is whether Nigeria, in its
desire to become self-sufficient, can comfortably encompass the economic aspects and, at the same time, arrest problems emanating from overgrazing, overintensive cultivation, and ecological disruptions.

One may feel that the mineral wealth and agricultural potential in Nigeria are sufficient to solve the problems. However, the country's efforts cannot be successful without systematic plans and decisions on which areas can most profitably support a specific activity. Planning and decision-making presuppose the identification of national needs and, based on systematic surveys of the country's resources and potentials, demarcation of areas prescribed for production priorities. Through this step, the nomadic populations' needs can be tied with the role the government wants them to play within production priorities.

It is gratifying that government agricultural policies have visibly shifted toward integrated agricultural development in the rural sector. I believe the reason for the shift is government realization that any long-term improvement in the Nigerian economy must be led by the rural sector, in which the majority of the population work and live. Now, the government must prepare rural people for the role they must play to improve the economy.

In the livestock sector, government policy is now tilted toward the settlement of nomadic herders under the integrated agricultural development projects (IADP). It is believed in official circles that settlement is the only alternative to ecological disaster. Also, settlement is seen as a guarantee for the future of the herders.

To do justice to the subject of livestock producers and production, I will examine the potential for a livestock industry within the country, appraise the national efforts to boost the operational techniques of production, and, finally, put forward suggestions for new approaches.

**potential for livestock production: land, animal, and human resources**

Any discussion on livestock production systems in Nigeria must centre on resources available to sustain and improve the performance of these systems. Also, importance must be accorded such factors as climate, soil, cultivation, and the prevalence of disease, particularly tsetse-transmitted trypanosomiasis. One may argue that the pattern of land use has had a direct influence upon the livestock production system Nigerian pastoralists have used for centuries — the traditional pattern of transhumance (Awogbade 1980a, b).

Land utilization in Nigeria is currently undergoing rapid and far-reaching changes due to industrial and agricultural expansions (Table 1 and 2). If the changes are not arrested through government intervention, the future for landless nomadic herders is gloomy, especially for the 1980s — a fact that has prompted recent efforts to modernize animal husbandry practices. One change is in the area of uncultivated grazing lands, once the preserve of nomadic herders. These lands decreased from 67% in 1951 to 50% in 1976. Moreover, a further decrease to 39% has been predicted for 1986 (Table 1).

A calculation of the grazing needs of 7 million head of cattle (Table 2) indicates that in 1951 there was a surplus of 33%. This means that 33% of the grazing land was underutilized for this period. From 1951 to 1976 due to
the intensification of agricultural, industrial, and related activities in the country, the amount was reduced to a mere 1.6%, a reduction that means grazing pressure (Table 2) was almost balanced with the carrying capacity of the rangelands. If the decrease in grazing land continues, the pressure from grazing in the future will seriously threaten the rural areas and, indeed, the agricultural system. A deficit of 8.2% is already predicted for 1986 (Table 2). The results of insufficient grazing areas are the overstocking of existing lands, the loss of natural vegetative cover, and the intensification of erosion and desert encroachment, the logical end being another Sahel, which is not in the interest of the herders or the efforts to boost cattle production.

One option open to policymakers, in my opinion, is to devise the means whereby the present percentage of uncultivated rangelands is maintained. Otherwise, Nigeria will be faced with ameliorating conflicts between the farming population and the grazers.

Table 1. Land utilization in Nigeria for the years 1951, 1976, and projections for 1986.

<table>
<thead>
<tr>
<th>Cattle population and year</th>
<th>7 million</th>
<th>9 million</th>
<th>9 million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1951</td>
<td>1976</td>
<td>1986</td>
</tr>
<tr>
<td>Uncultivated rangeland, primarily used in livestock (%)</td>
<td>67.0</td>
<td>50.0</td>
<td>39.0</td>
</tr>
<tr>
<td>Fallow land, 40% of which is usable for grazing (%)</td>
<td>13.8</td>
<td>17.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Nonagricultural land, including towns, roads, airports, etc. (%)</td>
<td>1.0</td>
<td>5.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Land under farm crops (%)</td>
<td>9.4</td>
<td>15.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Land under tree crops (%)</td>
<td>1.2</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Land under forest, 33% of which is usable for grazing mainly in the north (%)</td>
<td>7.6</td>
<td>10.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Cattle population and year</th>
<th>7 million</th>
<th>9 million</th>
<th>9 million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1951</td>
<td>1976</td>
<td>1986</td>
</tr>
<tr>
<td>Land area required to feed cattle population (6 ha/head) (%)</td>
<td>45.0</td>
<td>58.5</td>
<td>58.5</td>
</tr>
<tr>
<td>Land area available, including entire area of uncultivated bush, 40% of forest reserve (%)</td>
<td>78.8</td>
<td>60.1</td>
<td>50.3</td>
</tr>
</tbody>
</table>

Because of an inaccurate livestock census in the country, it has been totally impossible to assess the level of efficiency of range utilization. What has been done is an estimate of cattle population and the unit of grazable land one animal utilizes. At the lowest estimate of 8 million head of cattle, 8 million sheep, and 22 million goats (West 1978) with an offtake of 8% (International Livestock Centre for Africa 1979), Nigeria seems to possess an adequate number of animals for its requirements. But for many reasons the potential has not been realized.

The poor performance of the Nigerian livestock sector should not be blamed solely on the social, cultural, and environmental problems associated with the livestock owners. In fact, the nomadic system as practiced by the producers is, to some extent, still efficient given the tsetse infestation and seasonal shortages of fodder and other needed inputs. To me, the poor performance is a function of lack of effective planning in production priorities. This includes the lack of efficient management policies and the transfer of appropriate technology to the major producers on whom efficient production depends. In this respect, it would be preferable if solutions were not restricted to increasing animal populations but included efforts toward improving productivity per animal (at present, annual calving rate is 1–2% and milk production is low) and per unit of land with efficient veterinary services, genetic improvement, and health care. As it is now, the grazing system — one unit of cattle for 5–8 ha of unimproved land — requires urgent action.

The major livestock producers are the Fulbe. Elsewhere, I (1979) have detailed their range utilization methods. The Fulbe practice a transhumance pattern of husbandry (Stenning 1959) that, from any practical consideration, is an adaptation to the realities of the natural and the prevailing socioeconomic situation in Nigeria (de-Leeuw 1976). The reasons for low productivity within their husbandry practices are several but three can be singled out: lack of good quality feeds and water supply, inadequate provision of essential requirements for improved production, and disease risks. These have necessitated a transhumant lifestyle. However, the transhumance system as it is being practiced by the nomadic herders does not preclude the process of sedentarization that has been practiced by a few for some time now. They often settle willingly when a sedentary way of life can be achieved without detriment to their stock and their subsistence.

<table>
<thead>
<tr>
<th>State</th>
<th>Target area (ha)</th>
<th>Area acquired (ha)</th>
<th>Cattle (% of total for country)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauchi</td>
<td>2185440</td>
<td>57051.5</td>
<td>9</td>
</tr>
<tr>
<td>Benue</td>
<td>874130</td>
<td>339900</td>
<td>3.6</td>
</tr>
<tr>
<td>Borno</td>
<td>6556320</td>
<td>213725.87</td>
<td>2.7</td>
</tr>
<tr>
<td>Gongola</td>
<td>2185440</td>
<td>207825</td>
<td>9</td>
</tr>
<tr>
<td>Kaduna</td>
<td>1669040</td>
<td>256425</td>
<td>7</td>
</tr>
<tr>
<td>Kano</td>
<td>1214710</td>
<td>25989.9</td>
<td>5</td>
</tr>
<tr>
<td>Kwara</td>
<td>2670300</td>
<td>181899.7</td>
<td>11</td>
</tr>
<tr>
<td>Niger</td>
<td>1942500</td>
<td>50140</td>
<td>8</td>
</tr>
<tr>
<td>Plateau</td>
<td>2039620</td>
<td>159288</td>
<td>8.4</td>
</tr>
<tr>
<td>Sokoto</td>
<td>2913750</td>
<td>465570</td>
<td>12</td>
</tr>
</tbody>
</table>
those who do engage in sedentarization, most maintain a home base at the northern point of their transhumant circuit where some family members remain throughout the year and, in the majority of the cases, engage in farming activities.

To improve and increase production, one should look into the possibilities of encouraging these semimigratory groups to transfer their home base and associated cropping activity to areas where links with government agencies are easy. Such links are imperative now that the government has embarked on a program to encourage total settlement through the creation of grazing reserves. Movement could be encouraged through effective propaganda and provision of essential services.

**national efforts to boost cattle production**

By the early 1960s, it was apparent that the pastoralists of the northern savanna of Nigeria were gradually being pushed out of the more densely populated areas. Moreover, competition for most of the traditional grazing areas (*humris* — dry season grazing; *mashekari* — wet season grazing grounds; and *burtali* — cattle routes to water points) was increasing among the traditional users, the herders and the farmers; the competition eventually caused a significant proportion of the herders to migrate to other areas. Recognizing the problem, the former government of northern Nigeria drew up legislation reserving areas permanently and solely for grazing activities. Along with alleviating the threat that agricultural and industrial expansion into the rural areas posed to the nomadic herders' economic existence, the program was meant to bring about a gradual settlement of the nomads. It was suggested that if the program were successful, the nomads' children would be educated and regular health services would be made available. Furthermore, economic benefits would accrue through the regular marketing of the livestock products (milk and milk products). The legislation was eventually passed in 1965. But since that time, only small areas have actually been established.

Recently, the government program has been extended to accommodate breeding and fattening centres, pasture improvement to forestall rangeland deterioration, water development, supplementary feed programs, and research into the potential of locally bred cattle.

Past experience has shown that programs that are aimed at improving the quality of pastoral practices almost invariably fail; the possible exceptions are grazing reserves. Most of the pastoralists tend to be suspicious, with good reason, of attempts made by the government to interfere with or change their lifestyle. At present, however, some factors give cause for hope. There is ample evidence that a large proportion of both nomadic and seminomadic herders now realize that they cannot continue their traditional husbandry practices indefinitely. As a result, the herders now have a genuine desire to settle and combine arable farming with cattle rearing (Awogbade 1980a, b). It is estimated that 13% of the farmers of the federally owned Agricultural Development Project in Funtua, Kaduna State, are pastoralists. Many of these have ceased to keep cattle altogether, although some combine herding and farming. There is now some indication that similar projects will be introduced throughout Kaduna State. A large proportion of the pastoral
Fulbe may also be prepared to settle and cultivate if given the opportunity. The only problem in some parts of Kaduna State is that little uncultivated land is now available.

It is now being recognized in official circles that Nigerian resource endowments dictate that livestock rearing remain an adjunct to, and part of, arable farming (see 1975—80 national development plan). If the objective stated in the national development plan is any indication, nomadic herders will be encouraged to take up mixed farming, change their traditional production outlook, and thereby efficiently improve their use of rangelands. To carry out this objective between now and 1985, Nigeria would need 20 Mha of grazable land. So far only 2 Mha have been acquired (Table 3).

Of the total areas already acquired in 10 states, 872 296.67 ha have been gazetted as grazing reserves, and the remaining have yet to be done.

The government has been acquiring land very slowly, perhaps because of the large amount of funds required to pay compensation to the people who hold the land titles, or because of a deliberate effort to encourage entrepreneurship in the sector. Another reason may be the lack of heavy equipment with which to undertake major developments such as firebreaks, access roads, water supply, and stockholding facilities. At present, the designated states lack the capabilities to carry out surveying, demarcation, and construction. The lack of incentives for staff to work in the reserves, vitally necessary to encourage the personnel available, is also a problem.

Paradoxically, the difficulties inherent in establishing grazing reserves in low rainfall and highly populated areas, in the controlling of stock numbers and stocking pressures, and in the establishment of a sound system of range management may frustrate the government in the initial stages of the project. I wish to emphasize this as a warning. To my mind, such development cannot be successfully implemented without systematic planning and decisions about which areas can most profitably support which activity. These two basic steps need to be taken before the problems of managing the reserves and making the target population accept such a gigantic innovation are tackled.

traditional resource management system and an integrated approach

Cattle rearing is still in the hands of traditional livestock owners who belong to the landless nomadic and seminomadic groups (the Fulbe constitute 90%). Their system of husbandry relies mainly on natural grazing and crop residues that replace natural grazing during the dry season. The Fulani annually migrate from north to south in search of fodder and water—a pattern that characterizes their resource management methods.

The seasonal movements of the herders in and out of their traditional grazing grounds in the sudan and sahel zones are determined by the duration of wet and dry seasons, the extent of cultivated areas, and access to markets where dairy products can be sold and proceeds used for consumer goods. Hence a predictable cycle of movement has developed as the most effective
method of exploiting the spatially distributed resources (water, natural fodder, crop residues, veterinary services, market conditions, etc.).

Traditionally, areas south of latitude $12^\circ$ S have not been effectively utilized by the herders due to the infestation by tsetse fly. This infestation has resulted in waste of both natural forage and nutritious crop residues and has led to uneven distribution of the national herds, which, from all indications, is against the fundamentals of good rangeland management.

The government has intensified tsetse-eradication schemes and, through its policy of relocation of the national herds, has been trying to rectify the improper balance. So far, the results have been encouraging. For instance, a recent survey in Lafia and Mariga (both south of $12^\circ$ S) produced evidence that a large number of our nomadic herders have been spending longer periods in areas where eradication of tsetse fly has been intensified. Lafia and Mariga contain 37.7 and 23.5 head of cattle per km$^2$ respectively during the wet season, an indication of a reasonable movement to the highly infested areas. If the trend continues, grazing pressure, on the sudan zone particularly, should be reduced and the natural vegetation allowed to recover in the northern part of the country.

The old symbiotic relationship between nomadic herders and cultivators is breaking down gradually. Formerly, the herders brought their livestock into farm areas after harvest to clear crop residues. Both groups shared in the benefits. No money changed hands. However, in some areas where land is at a premium, there is at present an increasing resentment of the Fulani and their herds. Where herders are given access to crop residues, they now commonly pay for the privilege. One of the reasons may be found in the recent introduction of fertilizer in the farming system. Thus, the farmers may have the erroneous belief that organic manure is no longer required for their fields.

In a survey of 62 households among mixed farming pastoralists and semipastoralists carried out in Dutsinma Local Government areas, Kaduna State, my colleagues and I requested the groups to rank their expenditure on the maintenance of their cattle during the year. The objective was to determine the relationship between input and output on the purchase of crop residues for their cattle. In doing this, we took as dependent variable the amount the herders realized from the sale of cattle for the 1978-79 grazing season and as independent variable the expenditure on such things as crop residues, cattle supplementary feeds, herd boys, etc. A multiple regression linear model was obtained from the data. The most important variable, in all households sampled, was the amount of money spent on crop residues, which alone accounted for 35.5% of the variation in the income or amount realized. Next was investment on herd boys (23.4%) and supplementary feeds (3.8%) (Awogbade 1980a, b).

The major constraints inhibiting development of cattle rearing and, indeed, the traditional system of production are lack of pasture and crop residues (spatially distributed) and infestation by tsetse fly in the southern zones.

In a country where agriculture and livestock are the primary concern of more than 80% of rural dwellers, a rational, long-term approach should be taken so that a more efficient arable and livestock system can be introduced and the land use for both crops and livestock be maximized. Effective assistance from the government is essential for those who have already started in such a direction. In fact, integration of livestock and crop
Table 4. Estimated crop residues in 12 agricultural development projects in Nigeria. 

<table>
<thead>
<tr>
<th>Location</th>
<th>Area (km²)</th>
<th>Sorghum (t)</th>
<th>Maize (t)</th>
<th>Grain legumes (t)</th>
<th>Cattle that could feed for 180 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayangba</td>
<td>13150</td>
<td>4383</td>
<td>2922</td>
<td>2922</td>
<td>7575</td>
</tr>
<tr>
<td>Bauchi</td>
<td>66355</td>
<td>22118</td>
<td>14750</td>
<td>14750</td>
<td>38235</td>
</tr>
<tr>
<td>Bida</td>
<td>17000</td>
<td>5700</td>
<td>3800</td>
<td>3800</td>
<td>9852</td>
</tr>
<tr>
<td>Borno</td>
<td>117000</td>
<td>3900</td>
<td>2600</td>
<td>2600</td>
<td>6740</td>
</tr>
<tr>
<td>Funtua</td>
<td>7500</td>
<td>2000</td>
<td>1700</td>
<td>1700</td>
<td>4000</td>
</tr>
<tr>
<td>Gombe</td>
<td>5300</td>
<td>1770</td>
<td>1180</td>
<td>1180</td>
<td>3059</td>
</tr>
<tr>
<td>Gusau</td>
<td>4000</td>
<td>1300</td>
<td>890</td>
<td>890</td>
<td>2281</td>
</tr>
<tr>
<td>Ilorin</td>
<td>11775</td>
<td>3925</td>
<td>2600</td>
<td>2600</td>
<td>6759</td>
</tr>
<tr>
<td>Lafia</td>
<td>9400</td>
<td>3133</td>
<td>2100</td>
<td>2100</td>
<td>5432</td>
</tr>
<tr>
<td>Kaduna</td>
<td>68000</td>
<td>22700</td>
<td>15000</td>
<td>15000</td>
<td>39037</td>
</tr>
<tr>
<td>Sardauna</td>
<td>3800</td>
<td>1270</td>
<td>844</td>
<td>844</td>
<td>2191</td>
</tr>
<tr>
<td>Sokoto</td>
<td>140000</td>
<td>46670</td>
<td>31100</td>
<td>31100</td>
<td>80644</td>
</tr>
</tbody>
</table>

*a Method of calculations: Roughage yield per 450 ha is taken as 1500 kg/ha-year for sorghum and 1000 kg/ha-year for maize and grain legumes (Guidelines on the Development of Grazing Reserves, Memorandum to the National Council for Agriculture and Rural Development, February 1978) and it is estimated that an animal (bull/steer/cow) would be fed daily an average of 7.5 kg of dry matter.

husbandry has several advantages, one of which is a higher income per hectare through efficient utilization of agricultural by-products, animal manure, and access to other social services.

In addition, the federally owned integrated agricultural development projects should, as a matter of priority, include semisettled livestock owners in all the facets of their agricultural development. As of now there are 12 projects in the states where nomadic herders are found (Table 4). To reduce overgrazing and land degradation in the north where visible effects of erosion and overgrazing have been identified, the government should encourage smaller herds. One method is to relocate the national herds to underutilized areas, especially now that the government has intensified the tsetse-eradication program. No doubt, relocation would be acceptable to the nomadic herders because many of them are now complaining of overgrazing. The relocation of the national herds program has to be intensified with proper propaganda campaigns.

The government also should pay more attention to grazing reserves together with increased fodder production needs to improve production capacity within the country. The current program is focused on the settlement of the nomadic herders; it should concentrate on the aims of reducing cattle numbers in the sudan zone and, thus, arresting erosion and land deterioration, combatting epizootics, and providing much-needed newer and suitable husbandry practices.

In this respect, state and local governments must intensify their efforts to reserve land for grazing. Moreover, the federal government must provide adequate funds for infrastructures such as the demarcation of grazing and cultivation areas by fire traces, access roads, dams, and dipping centres in the reserves. The provision of infrastructures must precede settlement in the reserves. As with grazing pastures, inputs must be provided at subsidized rates and on a sustained basis.
The objectives of establishing grazing reserves — to provide adequate grazing land for the traditional users, to avoid deterioration of the ranges, and to encourage settlement — in my opinion, can only be achieved if the production capabilities of renewable resources and the optimal economic use of the potentials in these reserves are linked into one system of interdependent actions (Awogbade 1980a, b). Existing strategies must be reexamined, refined, and overhauled for the achievement of the desired goals of self-sufficiency in animal production. Also, the pastoral sector must be apprehended as an integral whole, and interacting local, state, and national mechanisms that make coherent national policies feasible must be initiated.

discussion

Hopcraft: I think it's easy for government planners to ignore producers and to believe that economic development and increased productivity comes from government activity rather than from the activities and behaviour of large numbers of producers. Brave talk of "government intervention" and "urgent action" begs the question of whether the interventions and actions actually help or hinder the producers and at what cost. In particular, suggestions that pastoralists should settle down and practice farming make no sense in the arid and semi-arid world of the pastoralist. In some areas, certain agricultural activities can be combined with animal husbandry, but often they cannot, and one should not be too optimistic. A further suggestion that disturbs me is the subsidized feeding of pastoralists' herds, especially with high-cost imported feed. It is unlikely that the output of this process is as valuable as the input, in which case the people would be better off if the expenditure were directly on them, rather than on their livestock. Above all, the danger of creating dependence on unsustainable subsidies is that it diverts producers from viable and self-sustaining activities.

Awogbade: In a number of places in Nigeria, pastoralists are spontaneously settling down to farming; thus it cannot always be seen as impossible. One cannot always compare East and West Africa. The aim of subsidizing feed is to gain Fulani support and avoid their exploitation by private traders. The pastoralists are enthusiastic about subsidized feed and would like more.
planning policy and bedouin society in oman

Mohsin Jum’a Mohammed, Ministry of Social Affairs and Labour, Muscat, Oman

Oman wraps the eastern comer of the Arabian peninsula, with a long coastal line stretching from the Arabian Gulf in the north to the Arabian sea in the south. There are mountainous areas throughout, and the plains of the Batina coast are suitable for agriculture, as are the different valleys stretching toward the eastern and western slopes in the country and in the southern province of Dhofar. But, the desert forms the major part of the country.

The population is estimated at 1.5 million, approximately 15% of whom are Bedouin. The Bedouin population is characterized by mobility, as elsewhere in the Arabian Peninsula. This behaviour is imposed by the way of life they choose: they are in pursuit of any cloud that may provide rain for their tribal territory or their Halif (friendly tribe) territory. Yet there are a considerable number of Bedouin involved in fishing and agricultural activities and working for oil companies.

Like Bedouin in other parts of the country, Shihuh move north and south in the Musandam territory. They go up to the Rous Al-Jebal mountains in winter where they cultivate onions, wheat, and other crops. They collect and store their water in barhas (holes dug in the ground). In summer, they move south to work as casual farmers or as date collectors on their own farms. A part of the population fishes during spring, winter, and autumn.

The Bedouin along the eastern coast of the country, and at Masirah island are similar to Shihuh but do not engage in fishing. They migrate toward the farms for date collecting in the summer.

Bedouin in the interior desert chiefly depend on pastoral life. For nearly 9–10 months of the year, they move in vast areas and come together for date collecting (tahdhir) at the nearest centre of the Wilayit to their territory. The Bedouin in the southern desert have the same lifestyle but do not participate in tahdhir because the monsoon rains fall in this part of the country and provide rich grazing for their animals.

As an oil-producing country, Oman is undergoing vast economic changes that affect life in every corner of the nation. Bedouin share the changing pattern of life, either by employment in the oil-producing and civil construction companies or by benefiting from the considerable social and

1 This paper was submitted but not presented at the meeting.
financial help provided by the government for service programs. The changes have brought many questions to the forefront:

- How do Bedouins live and what role have they in national defence as humans occupying the desert where little security or defence facility is available and where a long line of borders needs to be kept safe?
- What role does their lifestyle play in the safeguarding of the environment (wildlife, animals, trees, etc.)?
- Do the Bedouins contribute substantially toward the national income? If no, then could that fact be treated positively? If yes, are there ways to improve the participation?
- What can be done more effectively to increase the fishing and agricultural participation of the Bedouins?
- In the absence of any real study of the pastoral and nomadic socioeconomic organization, what can be done to improve the life of the Bedouins?
- What is meant by improvement? Does it mean government services? If so, what are the services the government should provide and how? If the services, for instance, are similar in quality to those provided to cultivators in nearby villages, must they differ due to the nomadic pattern of life?

One may expect that Bedouin life encourages high infant mortality and high mortality, in general, because of malnutrition and poor hygienic conditions, a very high percentage of illiteracy, and a poor awareness of religion. In regard to the economic situation, one has to consider cattle and animal feeding problems, especially during poor rainy seasons. There are also problems in trade: for Bedouins to live, they have to sell some of their cattle to buy dates and other necessities. Some people believe consideration should be given to housing for Bedouins; however, this emphasis is not necessary, for every tree in the Bedouin’s surroundings is itself a home. To solve the housing problem for the Bedouin who are pastoral and nomadic, government needs not a superficial study of their members and how many houses they need but a thorough social and psychological study of nomadic and pastoral society.

Prediction of the future form of Bedouin life is difficult for national planners, who are speculating about the present life of the Bedouin. The questions they are attempting to answer include:

- What socioeconomic changes will take place once the different services are provided to Bedouin society?
- What will the behaviour of the society be, and what will be the salient characteristics of their new life?
- What will be the percentage of their migration to urban areas, what political and social problems will result, and how can they be positively solved?
- What can the government expect from the Bedouins in the desert in regards to their participation in GNP, natural defence of the country, and protection of the wildlife?
- Does government intend to establish Bedouin settlements?

All these questions underline a philosophical and moral dilemma. Does the planner or decision-maker have the right to plan the kind of life the Bedouins will have? And is there an obligation for the planner or the decision-maker to intervene and ensure that the rapid changes now
occurring throughout Oman do not adversely affect the Bedouin? There are already many bad examples of effects of changes on their lives from their employment in the oil companies in their areas and of the damage done to pastoral societies.

The government, represented by its various ministries, has ambitious programs for Bedouin areas, especially in the 5-year plan 1981–85. Chiefly involved are schemes for health, education, social services, housing, fishing, industry, veterinary care, roads, and water supply. The Ministry of Social Affairs and Labour concentrates primarily on social security for needy families, help in case of natural disasters, employment opportunities, social awareness, vocational training, etc. This ministry, therefore, has a large role in changing the behaviour of Bedouin individuals. The big question remains without an answer: Is what is being planned enough and is it the right thing to do?
the research process: strategies, goals, and methods
In a semi-arid land, Maasai women use an umbrella as a sun shade. To be effective, research and development personnel should similarly consider whether their innovations are appropriate, taking into consideration the pastoralists' perspective.
One reason for the limited influence of anthropology stems from its reliance on nonrigorous methods such as participant observation and life histories, the value of which is not appreciated by planners trained in more scientific methods. This issue becomes especially critical in interdisciplinary collaboration between ecologists, range scientists, economists, and anthropologists.

The essential questions are how can data be gathered effectively and economically and how can social factors be incorporated in rigorous studies that are based on systematic methods, such as the ecological monitoring described by Croze and Gwynne in this section. Developed as part of the Global Environment Monitoring System of the United Nations Environment Programme, ecological monitoring combines three levels and scales of data collection from the ground by mobile teams and fixed stations, from the air through systematic reconnaissance flights (SRF), and from space through earth-resource assessment satellites such as Landsat. R. Dyson-Hudson suggests a combination of this ecological monitoring with anthropological methods in which the anthropologist uses indigenous concepts of time and space to order informal modes of pastoral communication to gain systematic information about individual pastoral movements. Ayele cautions against total dependence on statistics: qualitative methods can address key issues lost through statistical aggregation of information. Stiles advocates the use of archaeology in the development and testing of models of the relations between environmental, economic, and demographic factors, so important in determining contemporary development policy but difficult to assess given the longitudinal limitations of current research.

Despite the call for interdisciplinary research, the papers on the whole do not identify the precise means by which data of a qualitatively different nature can be interrelated and thus keep disciplinary assumptions in check. In particular, the need to develop methods for short-term development-directed social analysis was mentioned but not developed.
a methodology for the inventory and monitoring of pastoral ecosystem processes


Semi-arid rangelands throughout the world share a number of properties. They are characterized by extensive grasslands having:

- Environment-controlling factors, notably soil and rainfall, that are highly discontinuous in space and time;
- High rates of nutrient turnover;
- Large variations in annual production; and, consequently,
- Human and animal populations that are highly mobile.

In the past such areas have been left to independent pastoral peoples, largely because they have been remote and have had low potential for intensive agricultural or husbandry enterprises. Increased attention is now being focused on rangelands. The reasons are complex: the spread of agriculturalists and the attendant government interest and infrastructure; the need to bring outlying border regions under central control; a global protein deficit; and, more recently, a series of dry years that have resulted in considerable loss of life among humans and livestock.

The main objective of governments responsible for rangelands should be to manage production systems in a way that optimizes the welfare of the people in the long term. A system must be understood to be managed properly, and an understanding can be derived from data collected and analyzed in ways that elucidate the dynamics of the ecological, economic, and sociological processes in an area.

Thus, management strategies must be based on knowledge; the more complete the knowledge, the more likely it is that the strategy will produce the desired results. The ecological realities of the pastoralists work at a scale larger than that of any other rural society, one that extends far beyond the immediate group boundaries and incorporates whole ecosystems and biogeographic regions. To gather information needed for management strategies, one may take a ground-based, interrogative approach concerned with details, but this approach does not afford detailed information about the whole of the pastoralists' vast range and may well overlook the dynamics and sweep of the ecological events that mould the pastoralist's lifestyle.

In accounting for the behaviour of groups, we as researchers must be able to account for the range of influences they are subjected to at any one time. For example, if a group is in a particular place when we investigate it, we must have some information about other places to draw conclusions about why it is there. The food, water, and shelter in different areas are
essential environmental features to which pastoralists, and indeed all migratory species, react, through either direct comparison, cultural knowledge, or information built into the genome. The pastoralists' response to their environment and our investigation of it must be based on an appreciation of not only the current but also the long-term factors of their entire range. An extreme example is that of trying to predict the rainfall or forage production in 1 km$^2$ of semi-arid northern Kenya — such is the annual perversity of rainfall. However, if we study, say, 1000 km$^2$, our prediction of rainfall somewhere in the area would be made with more confidence. It is this sort of ecoclimatological notion that determines the land perception of pastoralists and that ultimately must determine the scale at which we examine the causal factors involved in their lifestyles. We need, therefore, survey and monitoring methods that may be applied regularly and relatively inexpensively over the whole range of ecological influences to the pastoralists.

Although rangeland-use planning and day-to-day land management have the same ultimate objective, operationally they deal with different time scales. Planning activities investigate the various options for land use in an area, i.e., what is currently going on and what is possible over a long term. Management, on the other hand, is concerned with relatively short-term tactics to deal with changes in production (primary and secondary) for a given set of environmental circumstances.

To reduce costs, operational agencies must seek a set of methods that, with a minimum of modification, are useful to both planners and managers of pastoral areas. We, the authors, believe that recently developed ecological monitoring strategies are able to serve both masters, as well as be of considerable use to anthropologists.

an appropriate strategy

Ecological monitoring is a strategy for collecting information on the life-support capacities of large areas of land. It is a combination of techniques; it has been developed and tested, largely in semi-arid regions of East Africa, over the past decade. The techniques are relatively straightforward and inexpensive. What is innovative is the way in which they are combined to produce a multidisciplinary approach to the problems of optimum use of natural resources.

In a nutshell, data on people, animals, plants, and the earth itself (soils, topography, etc.) are collected simultaneously from three levels:
- From the ground, by mobile teams and some fixed stations;
- From the air, by human observers flying at very low altitudes in light aircraft on systematic reconnaissance flights (SRF); and
- From space, by the colour-sensitive scanners in orbiting satellites such as Landsat.

Aerial photographs are also used, where they are available and where budgets allow, for additional interpretation and mapping.

The data are collected according to a systematic sampling strategy, both in space and in time. All of the information is then related to a grid of the area of interest. This spatial system allows easy mapping of distribution as well as analysis of the correlation between, say, the movements of pastoralists and the greenness of the grass. Moreover, data are collected regularly so that
changes in land productivity and use may be measured, studied, and understood.

The monitoring method is not a rigid strategy but is, rather, the flexible combination of intensive and extensive techniques to provide useful data for planning and management of large tracts of rangelands. Through correlations between intensive and extensive data bases (ground, air, satellite), useful and cost-effective statements can be made about actual and potential production, although, during correlation, some precision is sacrificed. The manager must carefully design sampling to minimize the loss of information on the one hand and to avoid drowning in detail on the other. Managers who know everything about 1000 km$^2$ will not be of much use to planners who must deal with 100 000 km$^2$, unless the former have some basis for extrapolating their results.

Thus, a primary management consideration in ecological monitoring is to balance effectively the low cost of extensive data collection techniques with the need for high-quality information from intensive data collection methods. For example, a Landsat image produces low-information data at a cost of approximately $0.01/km^2$. In contrast, a vegetation survey carried out by a ground team produces detailed data at a cost of the order of $100.00/km^2$. Clearly, the information quality of the extensive approach must be improved to be of much use, and the cost of the intensive approach must be lowered to be practical. The former can be done very quickly; the latter can hardly be done at all.

We (Gwynne and Croze 1975a) have argued that the most cost effective first look at an area is provided by the SRF. If repeated later, it provides more precise data on population estimates of animals or patterns of seasonal use by pastoralists. The precision is enhanced if the SRF program is run concurrently with collection of information on the ecological state on the ground. Time-series ground data are improved as well because the patterns of production change are related to controlling factors (e.g., rainfall and soil type) and modifying factors (e.g., animal use, fire, influence of humans).

The third tier of data acquisition, satellite imagery, in the scheme provides spectral reflectance signatures over both the microevents in production recorded on the ground and the mesoevents in transhumant distribution from SRF (Gwynne 1977).

Although the data from SRF rest somewhere between those derived from ground work and satellite imagery analysis in terms of information quality, particularly at the outset of the investigations, its cost effectiveness is considerably higher. This is a difficult point to quantify directly, although it is simple to show that the flying and data acquisition part of an SRF program is relatively inexpensive (Table 1). For example, it costs $13 000 to cover an area of 100 000 km$^2$, which is roughly three times the size of the Sahelian zone in Upper Volta. For this outlay, one would get data on permanent attributes (topography, soil, drainage, watering points, static animal features, such as termite mounds), semipermanent attributes (plant physiognomy, plant community composition, zoogenic features, distribution of nonmigratory mammals, human settlements), and seasonal attributes (rainfall; insolation; soil moisture; evapotranspiration; plant phenology; plant productivity; distribution, productivity, and population of migratory mammals; fire; surface water) (Gwynne and Croze 1975b). Comparable information collected from the ground, or from aerial photography with ground checks,
Table 1. Approximate costs of SRF according to intensity of coverage. a

<table>
<thead>
<tr>
<th>Intensity (distance between flight lines) (km)</th>
<th>Optimum area (km²)</th>
<th>Maximum daily coverage (km²)</th>
<th>Proportion coverage</th>
<th>Animal (%)</th>
<th>Habitat (%)</th>
<th>Cost (U.S. $/1000 km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>500-10000</td>
<td>5000</td>
<td>10</td>
<td>40</td>
<td></td>
<td>250</td>
</tr>
<tr>
<td>10</td>
<td>10000-500000</td>
<td>10000</td>
<td>5</td>
<td>20</td>
<td></td>
<td>130</td>
</tr>
<tr>
<td>20</td>
<td>&gt; 10000</td>
<td>20000</td>
<td>2</td>
<td>10</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>50</td>
<td>&gt; 100000</td>
<td>50000</td>
<td>1</td>
<td>5</td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

a The figures give order of magnitude estimates only and will be modified by as much as 25%, depending on local conditions. They include the cost of pilot, crew, and data analysis.

would take many hours, whereas, obviously, only the crudest of relationships could be derived from the first set of uncorrelated Landsat images.

The combination of methods allows correlations between them, which eventually should result in the phasing out of the more expensive, intensive techniques. Management and planning decisions may then be made as a matter of course and would be based on the cheapest data collection technique, backed up and checked at a manageable frequency with quality control air and ground samples.

As the monitoring program progresses and the correlations between the various levels of data acquisition increase, the relative cost relationships between the three levels of data acquisition change. The costs per unit of information from SRF are consistently the lowest. Those of ground work are the highest and become only slightly reduced with time. Initially, Landsat information is costly (though less so than ground work), but the costs drop dramatically because after relatively expensive initial ground correlation a remarkable level of detail is eventually possible for very large areas of land. Landsat information never quite reaches the cost effectiveness of SRF, largely because it is unable to cope with secondary production (i.e., domestic livestock and wildlife).

Up to the present, however, no area has yet arrived at the happy state in which a time series of satellite-generated data provides policymakers with the necessary information on which to plan and manage. Workers in this field are still at the stage of tentatively combining the methods and extracting the correlations. The reason for this retarded state of the art lies largely in an inherent conservatism among ground- or aerial-oriented researchers to expand beyond their predisposed data-collection platform. Another, more practical reason, is the lack of easily accessible, easily usable data analysis facilities. The advent of the interactive, user-oriented minicomputer is largely overcoming this practical constraint.

Results are what managers and planners require, and they are based on the organization of the flow of information (Fig. 1). To organize data collection and dissemination of analyzed information to managers and planners, one plans the approach, executes the initial stratification from a low intensity survey flight, fixes preliminary operational boundaries over the study area, initiates data collection from the three levels (ground, air, and space), analyzes the data, produces preliminary results, reviews the depth and scope of the information obtained (revises data collection, if necessary),
Fig. 1 Indicates the flow of information through an ecological monitoring unit (EMU), together with the organization of the EMU work plan and some of the results that an EMU can be expected to produce (adapted from a project document for rangeland monitoring in Senegal, which is typical for the network of the Global Environment Monitoring System, UNEP).
Collect climatic data

Plan study logistics:
- Maps, aerial photos, Landsat images:
- Equipment:
- Aircraft supplies:
- Aircraft:
- Sampling strategies:
- Arrange data analysis: etc.

(10) Do preliminary low-intensity survey flight

(11) Locate boundaries of pilot areas on maps, images, etc. and determine area limits on the ground

(13) Collect climatic data

(15) Locate sample flight strips

(16a) Initiate GW monitoring program

(16b) Initiate SRF program (2 SRF/year)

(17) Analyze data

Are data adequate?

No

Yes

(18) Prepare reports, etc

Start follow-up program

(12) Order aerial photographs

(14) Preliminary desertification maps

(14c) Preliminary soils, vegetation, land system maps

(14b) Preliminary desertification maps

(14a) Preliminary soils, vegetation, land system maps

(10a) Initiate Landsat Program

(16c) Initiate Landsat Program

(16) Order aerial photographs

(12) Order aerial photographs
prepares reports for operational units (management and planning), and initiates follow up programs (Table 2).

With careful organization in the initial planning and a degree of bureaucratic autonomy (to minimize time-consum ing delays, such as interministerial squabbles over territorial rights), there is no reason that the review state ("Are the data adequate?") cannot be attained within 18 months from the inception of the monitoring project. This suggests that managers and planners can have relevant reports in hand less than 2 years after the starting date. Moreover, because of the flexibility of the strategy, the full program can be short-circuited in cases of urgent need for rapid policy decision and bear fruit after the first half year.

Information, beginning at the determination of the existing state of knowledge of an area through the acquisition of further data and its evaluation to its distribution for management and planning, moves from the particulate in the initial stages to the general and is structured by the evaluation (analysis and synthesis) stage into forms suitable for short-term operation by managers and for long-term land-use allocation by the planners. Throughout, data are drawn from a number of disciplines —

Table 2. Approximate personnel-months, equipment inputs, and relative costs for a hypothetic 3-year rangeland ecological monitoring project comprising three senior experts and covering 100 000 km².

<table>
<thead>
<tr>
<th>Activity groupa</th>
<th>Personnel-months</th>
<th>Cumulative personnel-months</th>
<th>Elapsed time (months)</th>
<th>Relative project cost</th>
<th>Costs (%) of components cumulative</th>
<th>Special equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.0</td>
<td></td>
<td></td>
<td>0.7</td>
<td>0.7</td>
<td>Library, maps</td>
</tr>
<tr>
<td>2</td>
<td>—</td>
<td></td>
<td></td>
<td>0.1</td>
<td>—</td>
<td>Drafting table</td>
</tr>
<tr>
<td>3</td>
<td>1.0</td>
<td></td>
<td></td>
<td>0.3</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>1.0</td>
<td></td>
<td></td>
<td>0.3</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td></td>
<td></td>
<td>0.1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>0.5</td>
<td></td>
<td></td>
<td>0.4</td>
<td>0.4</td>
<td>High-wing, 4-seat aircraft</td>
</tr>
<tr>
<td>7</td>
<td>0.5</td>
<td></td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>1.0</td>
<td>6</td>
<td>2</td>
<td>0.3</td>
<td>2.4</td>
<td>—</td>
</tr>
<tr>
<td>9</td>
<td>0.5</td>
<td></td>
<td></td>
<td>0.3</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>10</td>
<td>0.5</td>
<td></td>
<td></td>
<td>0.5</td>
<td>—</td>
<td>Aircraft as for (6)</td>
</tr>
<tr>
<td>11</td>
<td>0.5</td>
<td></td>
<td></td>
<td>0.2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>12</td>
<td>—</td>
<td></td>
<td></td>
<td>0.1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>13</td>
<td>3.0b</td>
<td></td>
<td></td>
<td>1.2</td>
<td>1.2</td>
<td>Met equipment</td>
</tr>
<tr>
<td>14</td>
<td>3.5</td>
<td></td>
<td></td>
<td>1.7</td>
<td>1.7</td>
<td>Mapping facilities</td>
</tr>
<tr>
<td>15</td>
<td>0.5</td>
<td>15</td>
<td>5</td>
<td>0.1</td>
<td>0.1</td>
<td>Aircraft as for (6), small format camera, 4 × 4 vehicles, camping gear, neutron probes</td>
</tr>
<tr>
<td>16a</td>
<td>14.5b</td>
<td></td>
<td>8</td>
<td>26.7</td>
<td>6.5</td>
<td>Image viewing or digital analysis equipment</td>
</tr>
<tr>
<td>16b</td>
<td>30.0b</td>
<td></td>
<td></td>
<td>40.0</td>
<td>40.0</td>
<td>—</td>
</tr>
<tr>
<td>16c</td>
<td>10.0b</td>
<td></td>
<td></td>
<td>10.0</td>
<td>10.0</td>
<td>—</td>
</tr>
<tr>
<td>17</td>
<td>30.0b</td>
<td></td>
<td></td>
<td>13.5</td>
<td>13.5</td>
<td>—</td>
</tr>
<tr>
<td>18</td>
<td>9.0</td>
<td>108</td>
<td>36</td>
<td>3.3</td>
<td>100.0</td>
<td>—</td>
</tr>
</tbody>
</table>

a The activity group is indicated in Fig. 1.
b Activities that are repeated throughout the project.
c Time of first useful output from SRF data.
agriculture, ecology, anthropology, sociology, and economics — and management and planning cannot take place without information from all of them.

The close relationship between monitoring, research, and evaluation indicates the need for a single body to be responsible for the collection, processing, and dissemination of information for this activity cluster. At the national level, the task can best be done through a national government ecological monitoring unit such as that established in Kenya (Kenya Rangeland Ecological Monitoring Unit).

results: appropriate information

In the meantime, while the correlative data base is being built up both locally and globally through the Global Environment Monitoring System, national planning and management agencies are receiving usable, relevant information from ecological monitoring units. The units can provide such data largely because of the flexibility of the monitoring strategy. Given an explanation of the nature of the problems, they can provide useful information from any one or nearly any combination of the three tiers of data collection.

Ecological monitoring provides quickly and inexpensively a wide range of information relevant to productivity over large areas of agricultural, pastoral, or natural land. The information is of two sorts: state and process.

Information on the state of the land tells what the situation is like at a certain time. There are many types of questions that can be answered with inventory data from one single monitoring operation. A few examples are:
- How many cattle—dwellings—camps are in the area, and where are they?
- What proportion of the land is covered by different crop types?
- What is the current land-use pattern?
- What is the woodland cover?
- What is the state of the wildlife resource?
- What is the distribution of soils suited to irrigation?

Similarly, data analysis from a single ecological monitoring program in an area can tell about process, that is, what is happening in the area and what is likely to happen. For example:
- Is desertification increasing? If so, why?
- How will a proposed dam affect agricultural activity downstream?
- Are woodlands receding? If so, why?
- What are/will be the sociological, economic, and ecological effects of an irrigation scheme?
- What are the best locations for water schemes?
- What has been the effect of a drought on livestock numbers and species mix?

Results obtainable from SRF and from visual analysis of Landsat data at differing intensities of application (Table 3 and 4) are of use both to managers, who must make day-to-day decisions on how to run a particular part of the production system, and to planners, who have to account for the optimum use of large areas of land over long periods.

The continually updated information from monitoring has the additional advantage that it provides a check and measure of the effectiveness of
### Table 3. Some results from systematic reconnaissance flights. a

<table>
<thead>
<tr>
<th>Type of flight</th>
<th>Distance between flight lines (km)</th>
<th>Periodicity</th>
<th>Type of result</th>
</tr>
</thead>
</table>
| Inventory      | 5–10                               | Once only, or once every few years | • Estimation of size of domestic or wild animal populations;  
                  |                      |                     | • Permanent data base from which to draft maps of soils, vegetation, or topography;  
                  |                      |                     | • Distribution of infrastructure (roads, villages, water points);  
                  |                      |                     | • Verification of ecozone boundaries determined from aerial photos or Landsat imagery;  
                  |                      |                     | • Determination of stock routes.                                                           |
| Specific       | 20–50                              | Annual, beginning of rains  
                  | objective           | At peak of rains  
                  |                      | End of dry season | Seasonal | • Advanced information on beginning of “green wave”;  
                  |                      |                     |                      | • Estimation of annual production;  
                  |                      |                     |                      | • Distribution and type of burns;  
                  |                      |                     |                      | • Estimations of animal population sizes of increasing precision;  
                  |                      |                     |                      | • Distribution and phenology of vegetative cover;  
                  |                      |                     |                      | • Seasonal animal distribution;  
                  |                      |                     |                      | • Distribution of biomass of primary and secondary production;  
                  |                      |                     |                      | • Correlations between biotic and abiotic factory;  
                  |                      |                     |                      | • Establishment of boundaries of ecological management units;  
                  |                      |                     |                      | • Correlations between animal distribution and spectral signatures from Landsat imagery |
| Monitoring     | 5–30                               | Seasonal            | • Estimations of animal population sizes of increasing precision;  
                  |                      |                     | • Distribution and phenology of vegetative cover;  
                  |                      |                     | • Seasonal animal distribution;  
                  |                      |                     | • Distribution of biomass of primary and secondary production;  
                  |                      |                     | • Correlations between biotic and abiotic factory;  
                  |                      |                     | • Establishment of boundaries of ecological management units;  
                  |                      |                     | • Correlations between animal distribution and spectral signatures from Landsat imagery |

* The operations are not mutually exclusive; for example, an SRF for a specific objective could produce results obtained from monitoring.

Management itself: the same methods that provide information on which to make decisions for action are suitable for monitoring the effects of the actions.

**postscript**

It is with some humility that we offer the above approach for the consideration of anthropologists. We are sure that there can be no real understanding of the problems of nomads without full comprehension of the dynamics of the ecosystems in which they live and move. Gaining this
information for the range of habitats exploited by any given nomadic peoples must be a number one research priority for the 1980s. We are also certain that the approach we have outlined here is one of the best and most cost-effective ways of obtaining this information. The arrogance of our certainty that it is the best way to assess problems in semi-arid ecosystems is tempered with the realization that anthropologists are one group that is in a position to take monitored information, synthesize it, and turn it into sensible planning options for decision-makers — options that will lead to actions that will benefit both the state and, most importantly, the nomads themselves.

The rate at which the pastoralists are coming under both political and ecological pressures is increasing exponentially. Their future rests with proper land-use decisions. The perceptions and insights gained from just one family group or a settlement in one area may be locally true but generally misleading. We have argued that the optimum decisions cannot be made with local-scale information because the pastoralists in time depend on extensive areas for their well-being. Although intensive anthropological (and social, economic, and political) studies are being set up in key areas, we believe it is imperative that “quick-look” inventories be initiated over large (if not all) pastoral areas to help guide decisions that are taken precipitously, no matter what we do, and to provide a long-term basis for other decisions that are taken more thoughtfully, on a basis of an understanding of both the people and their ecosystems.

More research effort should be put into examining the details of pastoral ecology so that the minimum amount of land necessary for a sustainable living for any particular group and their progeny is set aside and managed.

It seems to us that there is a need for anthropologists to know more about the workings and maintenance of the animals that their peoples manage. Feeding mechanisms, diet requirements, metabolic tolerance, water turnover, and behavioural adaptations, such as progression rates, degree of scattering, herd social structure, are subject areas on which the very lives of pastoralists depend. Much of the information is already in the literature, awaiting the anthropologists’ attention. The anthropologist from his or her

<table>
<thead>
<tr>
<th>Type of image</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : 1 000 000 mosaic of colour composites</td>
<td>• Preliminary definition of ecological zones</td>
</tr>
<tr>
<td>1 : 1 000 000 colour composite transparencies (in a seasonal series)</td>
<td>• Identification of ephemerally green areas; • Identification of zones with a high production potential; • Estimation of occupancy by pastoral peoples, domestic stock, and wildlife (given correlations with a data base of distributions from SRFs); • Soil humidity (given correlations with a data base from ground studies).</td>
</tr>
<tr>
<td>1 : 500 000 and 1 : 250 000 colour composites, paper positives, or transparencies</td>
<td>• Preliminary topography, soils, or vegetation maps</td>
</tr>
</tbody>
</table>
stance of intimacy with the pastoralist should be able to point out to ecological colleagues the data that are lacking.

**discussion**

*Marx:* At what stage do you bring in assumptions about pastoralists, such as the type of economy?

*Croze:* We are not sure it is necessary to bring in any assumption. Ecological monitoring allows planners and managers (and even the pastoralists) to understand more fully the systems with which they are dealing. Obviously other data are brought in as well, data best supplied by the pastoralists and their interpreters, sociologists and economists.

*Schneider:* I am shocked no one here has challenged Dr Croze's assertion that pastoralists don't choose to be pastoralists. People in arid zones have the highest ratios of cattle to people. It is also true that pastoralists consider cattle to be wealth. Hence it makes sense to suspect that some people choose to move into the arid zone simply to become wealthier.

*Croze:* Whether or not they choose to live in arid areas is indeed a social and political issue. Once they are there, the choice of how to make a living is very narrow. There will be variations, but the main theme will be chasing ephemeral protein and water around the ecosystem. That is a fact backed with data.

*Schneider:* How can you deduce desertification from only three production cycles?

*Croze:* In only three production cycles, one gets an indication of what is going on, although long-term monitoring can confirm whether a deficit in production is cumulative or merely cyclical. It is important to look at both plants and animals — one reason the method was developed. Over a decade in a semi-arid region of Kenya, the grass cover changed from perennial-dominant to annual-dominant and back. Secondary production — cattle — remained constant or even increased. The ecological monitoring method gives a clear picture of livestock trends over three cycles.

*Hopcraft:* How does your analysis assess vegetation changes?

*Croze:* In the Kaputei region of Kenya in the 1960s, vegetation was predominantly perennial. Then, from the late 1960s through the 1970s, there was an increase in annuals, probably due to less rain and lower stocking. Now the species composition has changed back to a predominance of perennials, with an increase in rain but with the same stocking level.

*R. Dyson-Hudson:* Can your program study individual and group behaviour? Perhaps the cost effectiveness of research ground work can be improved, through the use of anthropological data.

*Sandford:* We have thousands of monitors in the pastoralists themselves and could use the environmental information supplied by them. Your system is very centralized and so may be inappropriate for day-to-day processes. It could be dangerous to make decisions on information that is not that useful in microdecision-making.

*Croze:* The distribution of soil and vegetation types, people, and animals, the greenness of the grass, and the number of huts and gates in a settlement
exist pretty well independently of planners and academics. We agree that there is a wealth of ecological data to be supplied by the herders, who are, after all, practicing ecologists. Centralized systems may be inappropriate in rural areas but we have centralized systems to deal with; it was the government of Kenya through FAO (Food and Agriculture Organization) that asked us to think about management of wildlife and livestock in Kajiado some years ago; it is the UN General Assembly and the governing council of UNEP that asked us to consider arid lands today.

**Hjort:** We need demographic data on age and sex distribution of livestock. Does your monitoring provide it at a reasonable cost?

**Croze:** Such herd details are best collected by ground work.

**Aronson:** The figure you quote for one flight is about the cost of a year's fieldwork by an anthropologist, who might cover less ground but would get far more information about the society. Also, you have said these data go to the planners. Why not to the pastoralists themselves? Otherwise, don't we concentrate power in central hands?

**Croze:** Your worker on the ground would get good information but only about a fraction of the land and of the plant, animal, and human influences. Both intensive and extensive data are necessary. Projects are formulated with national governments, and we have to hope they reflect the wishes of their people. Few of us are able to bypass the central machinery.

**Gwynne:** The information does get back. In the early Landsat project, which examined northern Kenya, information was returned to pastoralists in 2 weeks, and they were diverted from certain areas.

**Goldschmidt:** Your research program can exacerbate the very problems development personnel seek to alleviate. I come from California where growth of farm technology has served the large-scale corporate farm, at the expense of the family farmer. I understand aerial reconnaissance has helped larger fishing operations. Your methods can have the same kind of effect on the pastoralists.

**Conant:** Do your observers have anthropological knowledge? Why do you not use photography more?

**Croze:** Photography is expensive and only picks up visible static features. Our system picks up movements.

**Bourgeot:** The presentation reduces an ecosystem to the primary producers alone. The ecosystem is like an equation of three elements, with animals between humans and nature.

**Rigby:** Your methodology seems to lead you to ecological determinism. The argument that pastoralists are what they are because they have no choice distorts the nature of the pastoral social formation. They choose to be pastoralists and may choose to go into semi-arid regions that can be exploited by agriculture.

**Croze:** Their choice of what to do for a living is limited in arid and semi-arid ecosystems. Movements of pastoralists over their range are determined by ecological factors, such as rainfall and availability of grazing and water. If you live in a region with less than 500 mm average annual rainfall, you cannot be a farmer unless you can afford to irrigate or have some special claim to the one river running through the area. We do not presume to explain the social
formation, but we are able to predict the distributions of pastoralists and account for why they herd rather than farm.

Sihm: We development personnel are in a period of doubt about the way we have been proceeding. These doubts represent some of the reasons that the monitoring system UNEP has just presented is coming increasingly into demand. Anthropology is the most difficult of the disciplines to integrate into our research program, but without it we shall never understand, in Croze’s words, “how the system works.”

Croze: This methodology makes a positive contribution to development of pastoral areas, one that complements the work of ILCA (International Livestock Centre for Africa). It is up to anthropologists now to contribute also to the job of surveying and monitoring for development.
indigenous models of time and space as a key to ecological and anthropological monitoring

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The relationship between ecology and economy is of great theoretical import in an understanding of pastoral nomads. Yet, as illustrated by the discussion between Harvey Croze and Harold Schneider at this meeting, it is difficult to reconcile the approach of the biological ecologist, which focuses on environmental constraints and broad patterns of population movements, with that of the economic and ecological anthropologist, which focuses on individual human activities and motivations. I will not attempt a general synthesis of ecology and economy. Rather, I shall suggest how the on-the-ground approach that anthropologists use for monitoring pastoral population can be integrated with large-scale ecological monitoring, as presented by Croze and Gwynne. A unified approach would provide data about East African pastoral populations and their movements in space and time, both specific information about the behaviour of individual herd owners and aggregate information about the behaviour of the whole population.

The monitoring studies of Croze and Gwynne clearly provide valuable background and backup information for anthropological research. Their conclusion that East African pastoralists are "chasing protein across the landscape" cannot be dismissed because data from their studies document that, as an aggregate, the movements of the East African pastoralists living in arid regions conform with this interpretation. However, as an outgrowth of recent developments in evolutionary and ecological theory, ecologists are increasingly recognizing that, to understand the ecology of a species, it is not enough to determine the distribution and abundance of aggregate populations in space and time. The behaviour of groups is the result of the sum of individual actions based on individual decisions, and the self-interests of each individual are different.

East African pastoralists are part of extremely complex ecosystems, with many interactions within and between trophic layers. Although protein — good grazing for the livestock — appears to be the primary determinant of nomadic movements, there are other factors in both the biotic and the social environment influencing movements of individual herders.

We as researchers must study the differences between individuals, as well as the overall patterns of the groups, to understand the system of livestock management. With a sparsely settled, highly mobile population, actually observing the behaviour of individuals and their herds provides important, detailed information about individual actions and strategies that
can be gained in no other way. However, as a method of monitoring the movements of many individual herd owners over long periods, it is clearly not cost effective. A major advantage of studying humans (as compared with other animal species) is that they have a complex communication system, which can actively supply information. Although what people say they do is not necessarily what they do, asking questions is nonetheless a valuable means to gather information about actual behaviours, as well as about symbolic systems, beliefs, cultural norms, etc.

Nomadic herders have an extremely sophisticated means of communicating information about location and direction. They have very generally known names for environmental features that enable people to communicate information about the location of a herd, or of another individual, and that are regularly used to communicate information. By learning the nomenclature of a particular group of nomadic pastoralists and gaining their trust, one can use their communication system to find out where individuals are, without visiting each one. This involves surveying and plotting local names for landmarks on maps and requires a large initial investment of time. But, once accomplished, it means that by questioning a few individuals, one can find out where many individual herd owners are grazing their herds at one time.

The communication of information about time among East African pastoralists is more problematic. Vocabularies and grammars prepared by European missionaries and administrators generally translate native terms for months as if they correspond to the Western lunar calendar. For example, “the month of the hares” is translated as January; “the month of the mushrooms” as February. But my experience with the Karamojong has been that people often do not agree about what month it is. I believe that because of the unpredictability of rainfall in East Africa, many, if not most, nomadic pastoralists have a relative calendar. Thus “the month of the hares” is when the hares breed, be it December, January, or February; and “the month of mushrooms” begins when the mushrooms sprout, about 6 weeks after the first major rainfall.

It is difficult, but not impossible, to relate the “months” in a relative calendar to our absolute measures of time. The first step is, by questioning the herders, to identify the events in the environment that serve as temporal landmarks in the calendar of nomadic pastoralists. These can be related to the Gregorian calendar by the use of satellite imagery and information from aerial surveys, in conjunction with on-the-ground studies.

If one succeeds in identifying how a particular group communicates information about time as well as about space, then one can gain access to a great deal of information about individual movements at a very low cost. It is then possible to do a ground study, perhaps once every 6 months, or even once a year, and ask particular individuals:

- Where were you in the month of ________?  
- How long did you stay there?  
- Where did you go next?  
- How long did you stay there?

Mapping this information shows both the similarities and the variations in the patterns of movement of individual herd owners.

Among the Karamojong, although all the herd owners were “chasing protein across the landscape,” they each moved their livestock in a totally different orbit. And each orbit seemed to be understandable in the light of
such factors as the herder's personal experience, family needs, tolerance of the discomfort of the stock camp, willingness to take risks with disease and enemies, and labour supply. With specific information about individual movements in time and space, it is possible to gain insights into decision-making and the multiplicity of factors that influence each herd owner.

I believe that, before one can predict how development will affect pastoralists, one must first understand indigenous systems of livestock management — not only what people do as an aggregate, but why and how they behave as individuals. Being able to map the movements of individuals in time and space as well as mapping aggregate movements is essential to an understanding of these systems. The adaptive behaviour of pastoral nomads depends to a large degree on spatial mobility. Each herd owner has continually to respond by movement to temporal changes in such environmental features as grazing, water supplies, livestock and human diseases, and the location of human competitors and of friends. Survival depends on regularly finding successful solutions to such spatial problems as: Where is good water? Where is good grazing? How do I find my way to these places? Who will be there when I get where I am going? Pastoral nomads have cognitive models for conveying information about variations in environmental conditions and detailed cognitive maps for communicating information about the location of people and livestock in time and space. By learning how pastoralists organize and communicate information about environmental conditions and about location in time and space, one can gain information about individual movements in time and space, which can supplement studies of distribution of livestock and human aggregates and can also serve as the basis for studies of decision-making among nomadic pastoralists.

discussion

Little: What do you mean by “chasing protein across the range”? Do you not think that factors are important in determining herd movements other than that of chasing protein? My research in Baringo, Kenya, has revealed that access to markets, especially for grain, is one of the more important factors influencing herd movements. I am sure that, in Turkana, access to famine relief camps is an important factor influencing herd movements.

Western: Chasing protein means that livestock movements are determined by range production. There is no argument with the significance of the factors you describe. Ecology not only is about environmental constraints but about other constraints as well. No one criterion can be used exclusively, and there are other important factors, such as access to markets.

Saltzman: In studying communication, we must not disregard lack of it, especially when intended. I recall addressing a headman on the main street about a particular pasture. He hushed me up. But, I protested, did not everyone have a right to that pasture? Of course, he whispered, but we have no obligation to tell them about it.

Goldschmidt: The issue posed here is not a true conflict; the ecologist is discussing one order of events while the anthropologist discusses another. The ecologists do not observe the action of every animal, nor are they concerned with its motives. The ecologists only recognize events in general.
Actions as motives illuminate the complexity of events. But these are not in conflict with an ecological causation scheme.

*Marx:* I notice a reluctance to follow a pastoral group for long. This may partly be because of the belief that the need for protein determines pastoral movements. Many other factors affect movement — markets, shops, transportation, employment, etc.

*R. Dyson-Hudson:* A study of the movements of a pastoral group over a long period provides information that can be gained in no other way. However, it takes enormous time, and very few groups can be studied in this detail. The method I am suggesting can provide not depth but breadth of information, which is important for monitoring movements and understanding the system.

*Khogali:* The nomads of the Sudan (and other countries of the Middle East) have their own way of telling time based on the moon and stars. This even enables the nomads to predict rain.

*Conant:* Pastoral studies are catching up with other aspects of anthropology and are incorporating the cognitive categories of pastoralists. Perhaps we can benefit by earlier work in cognitive anthropology.

*Western:* Each scholar here has a specific expertise; but the pastoralist has all the capabilities we address. Whether the pastoralist is acting rationally is a difficult question. Why are anthropologists here discussing the future of pastoral peoples without the people? They may have studied pastoralists, but planners have not received this information.

If there is little change in the environment, less labour is needed to control the herd, and vice versa. The notion of stability, implicit in nonmovement and nonhoarding or constant dispersal of animals, is ill-founded. In cattle, a constant metabolic rate is no advantage when resources fluctuate. Cattle do not have a stable metabolic rate in semi-arid areas; those that do need more energy are less able to survive. Pastoral production of milk is a quick exploitation of resources. Here is the answer to the question of why hoard, for rapid returns are possible. Why move? In the best conditions, movement doesn't matter. In the worst conditions, hunting for grass evens out seasonal fluctuations.

Some pastoralists take on other occupations — cattle trading for instance. There has been no systematic comparison of the productivity of subsistence pastoralism with that of commercial ranches. In certain areas, agricultural productivity will be greater. But this is not so in arid lands, where productivity already may be at its highest.

*Dahl:* I support Dr Western's recommendation for comparisons between the efficiency of different production systems. The political success of a system is based upon its profitability for groups holding political and economic power. Thus, even if a system is less productive for all society, it may bring more profit to a restricted group.

*Ayele:* I believe pastoralism demands a large labour force. In northeastern Ethiopia, children aged 5 herd lambs and kids. At age 8–10, they herd sheep and goats. At 15, they tend cattle and camels.

*Salih:* We cannot separate pastoral production from other types of rural production such as traditional farming, hunting, fishing, or cottage industries,
which face similar problems. Recently the balance of political power has shifted against pastoralists in favour of sedentary populations. In contrast is Jordan. Here the Bedouin are close to the state as they constitute most of the army. But in spite of that, pastoralism is disappearing. One can argue that Bedouin settlement is self-generated. Social change is inevitable in pastoral societies. So we have to intervene; if it occurs haphazardly, the pastoralists will be the great losers.

N. Dyson-Hudson: I am presenting aspects of a collaborative research strategy in Turkana, which will be transferred to ILCA over the next 2 years. There are several assumptions underlying this research:

- First, social behaviour is usefully approached as “contingent response” behaviour, as established by Raymond Firth. People approach situations with social and cultural attitudes, and they continually recreate their societies. This approach is useful for the study of change.
- Second, in the savanna ecosystem, a lack of moisture has led to distress. Is a rational strategy for the short run suitable for long-term cycles? Our major problem is to work out a method for dealing with multiple cycles that coincide and interact and to predict behaviour with an averaging procedure.

If the environment is variable, and the key problem is survival, what is the individual response and what is an aggregate survival response? This question focuses attention on the pastoral production system, which in East Africa is characterized by about 30 features. It involves low energy outputs and is labour-intensive; labour involves both sexes and people of all ages. It is high in skill and low in tools. The labour is grouped into family firms, which have accounting procedures and compete with each other. Within the firm, there is a hierarchy of decision-makers. These groups separate and recombine. The expanding human population drives the cycle, aiming to increase stock to meet the needs of the labour force. Ultimately, the political framework guarantees access to resources for each family. However, people can never be completely guaranteed resources, so there is uncertainty. The relation of human to livestock populations is parasitic rather than predatory. Pastoralists are essentially dairy ranching and live off the products of their herds rather than the herds themselves. Pastoralists’ main aim is to ensure continuity of food supply, an essentially subsistence strategy. There is a relatively high ratio of human to livestock numbers, the object being to support a maximum number of people, not stock. The calving rate varies with climate; livestock population growth is low in the dry season as a result of low calving rates and high mortality. Thus, there is an eccentric ratio of supply and demand.

A single-investigator operation was impossible, given the need for the multidisciplinary approach. We needed 6 years to raise the $500 000 needed for 2 years of team effort. We are studying several problems: the allocation of natural resources within the group, livestock management, the cognitive ecology, human biology, herd structures and dynamics, and pastures. We hope the research will deter massive, inappropriate interventions by developers, which have not worked and will not work. The failure of developers to understand this rests with the social scientists, because we have not been able to give them the knowledge they need for the decisions they have to make.
Marx: It would be a mistake to treat pastoralists as people who engage only in herding. They engage in a variety of economic activities. How does your project cope with this problem?

N. Dyson-Hudson: The interrelation between the human and livestock population is so complex that no anthropologist has come even close to dealing with it. Our intention among the Turkana is initially a focus on human and livestock dynamics. Later we shall attempt comparable precision in dealing with the nonlivestock elements of Turkana survival. We will consider the use Turkana make of wild plants, wild animals, and grass (whether grown or acquired by trade).

Willby: Is it not time that social anthropologists begin future-oriented, rather than retrospective, research on society’s views of development options, help choose interventions, and predict the most acceptable and successful? So far, social anthropologists are largely wise after the event and remain uncommitted and uninvolved in the development processes. Although there is no position for a social anthropologist in either of the World Bank range development projects in Somalia, use of such professionals was foreseen in the nonformal education component, and one has already been employed in study of a range cooperative.

Hopcraft: Improvement of welfare is the explanation for what the pastoralist is doing. Economists use the words “income maximization” to cover much of this decision-making, in that goods and services and even social factors can be exchanged and traded for one another.
the collection and interpretation of quantitative data on pastoral societies: reflections on case studies from Ethiopia

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Planning is laying a course of action to realize desired goals. Action uses resources, and the desired goal is called an objective. Hence, planning is a question of deciding among alternatives, using different combinations of resources, with reference to the realization of objectives. The planner should be in a position to assess alternatives before selecting one.

Planning involves forecasting based on information — a measure of the real situation. Most of the information essential for planning is in the form of quantitative data, which are based on observation. The simplest operation that can be performed on quantified data is to calculate averages. An average is a mean of the highest and the lowest observation and is expressed in numbers.

**use of averages**

What information can be gained by the calculation of averages from single measurements? One average that is useful to planners is the cost per unit item, which can be used in cost–benefit analyses, rate of return, etc. Such analyses are tools in choosing the most satisfactory way of realizing an objective. Also calculating averages simplifies handling of large amounts of data.

Nevertheless, quantification is only a guideline. What information is lost when single measurements are calculated into averages? To answer this question, one can compare herd growth in reality with herd growth in models. Units that are actually practicing herd management are studied, and an attempt is made to identify the factors affecting their management practices and their herd growth.

**herd growth in reality**

In pastoral societies of East Africa, the management unit is usually based on family relationships. It is both a production and a consumption unit. Its
composition depends on the development cycle of the family. The family
develops by birth, marriage, and death of individual members. Family
development is in turn affected by the relation between the family and its
means of subsistence.

Family development, on the other hand, can be seen as children are
born. These personnel, through socialization, are made to accept certain
duties and later given more responsibilities.

These processes result in the shaping and moulding of economic groups
of specific composition (Rudie 1969–70). Changes in family composition
lead to changes in the means of subsistence and in the labour force. The
system is viable as long as there is a balance between the number of animals
required to satisfy consumption needs and the amount of labour to satisfy the
labour requirements. Naturally, this balance is affected by the family
development cycle. In examining this concept further, I will refer to Borana
nomadic pastoralists, exploring: what the management unit is and how the
herd is established.

Each male child is presented with a heifer at his naming ceremony,
which takes place when he is about a year old. This gift is locally referred to
as handura (navel) cattle and is the beginning of his herd. It is supplemented
later with further gifts, animals obtained in raids, etc. A successful warrior can
collect a large herd by raiding (Baxter 1966).

When a man marries, he pays the bride’s family three head of cattle,
consisting of one cow and two bulls. These are given to the father, and it is
assumed that he can dispose of them as he wishes. When a young man and
woman marry, the herd should be large enough to support them. By the time
the newly married couple have a child old enough to look after the herd, a
family is said to be viable.

On the domestic side, the women build the huts and control activities
that go on inside them, such as making food. Women make milk containers
and leather costumes, and the men are responsible for building kraals and
fences. They carve wooden utensils and tools; they also build dams and dig
wells.

Unmarried adolescent girls and uninitiated boys help their mothers in
the construction of huts. Preadolescent boys look after the milk cows, their
calves, a bull, and horses. These animals graze around the homestead and
are called lon warra. They supply food for the part of the family that remains
permanently in the homestead. Men and adolescents, assisted by young
boys, take the remaining animals to graze farther afield. These animals are
called fora — reserve herd — and generally include dry cows, bulls, heifers,
steers, and a few milk animals for the herders. When homestead cows
become dry and milk cows become available in the fora, a shift takes place.
The major shift takes place during the rainy season, when fora animals are
brought to the grazing areas of the homestead herds.

Watering is the most labour-intensive work, and all members of the
family lend a hand. The pattern is that for the warra animals, the wife of the
head of the household or preadolescent boys are responsible, whereas the
head of the household or adolescents take care of the fora. However,

1 The Borana live in southern Sidamo Administrative Region and occupy an arid
region along the border of Kenya.

2 Animals belonging to a particular household are often split into a subsistence
herd (lon warra) and one or several reserve herds (fora).
different kinds of herding arrangements are also practiced. Families of the same encampment or kin groups sometimes keep their warra and fora cattle together, depending on the size of a herd and the available labour force. If camp groups have few warra and fora animals, the members usually herd in turn. In the pastoral sector, the labour required for the care of one animal is usually also sufficient for the care of enough animals to feed the family. Once these minimum labour requirements are met, the productivity of the herd will not increase with the addition of labour.

A family is said to be viable because the labour it can provide is enough for the exploitation of its means of subsistence, the herd, which in turn is adequate for the support of the members of the domestic unit. Viability in pastoral production requires that herd offtake (slaughter, consumption, gifts, mortality) be less than the reproduction rate (Haaland 1979). A pastoral unit is less than viable if its food consumption is greater than the reproduction rate of the herd.

However, the question of viability extends beyond this level: to find out the viability of a pastoral unit, one must consider ecological, economic, and political factors. "Behavioral solutions are selected with reference to how satisfactory they are as strategies of value maximization given the preference and skills of actors, and the limitations imposed by the conditions they operate in" (Haaland 1976:4). The political and economic environments are important in determining the viability of an individual actor.

Inheritance rights are another aspect of herd growth seen in reality and are also related to the family development cycle. "The rule of primogeniture is one of the few points at which an authoritarian principle intrudes into an egalitarian social system. The rule is a major source of tension in Borana family life and it affects the structural core of the patrilineal descent group: it has the effect of scattering brothers and breaking up the joint families that brothers are expected to set up after their marriage" (Legesse 1973:25). Primogeniture among the Borana means that the eldest son inherits the herd. Young brothers are dependent on the eldest brother for some share in the stock, and he depends on them to herd animals he has inherited from his father.

**herd growth in models**

To have a clear picture of herd growth in models, one should understand how a herd is defined. Management responsibility and property rights do not always coincide among pastoralists. Most anthropologists claim that the stock friendship system, which is a system of insurance against disaster, is typical of East African pastoralists. This redistribution system creates a flow of animals from those with more cattle to those with few cattle.

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3 According to Baxter, who did fieldwork in Kenya, redistribution by the stock friendship system is not important. Bride wealth is low, four head of large stock and some oddments, and is seldom transferred from one herd to the other. Borana divide their stock into lactating cows, dry cows, lactating camels, dry camels, and sheep and goats. Most Borana keep animals of each type. Close agnates, particularly brothers, live in dispersed villages. Each stock owner has an interest in his total herd, which is geographically dispersed, and several stock owners living at a distance have interest in the herd he manages. However, from the short period I have been in Borana country, I retain the impression that the stock friendship system does prevail among the Borana of Ethiopia.
or to stockless individuals in exchange for their labour. In terms of milk production, a herd is a management unit, but in terms of slaughter and disposal, it is property. The relation between property rights and management responsibility is not as complicated for small stock as it is for cattle or camels. Small stock reproduce rapidly, and redistribution systems are less important. However, it is difficult to find out how many cattle a household "owns." The reason is that herds as ownership units are difficult to distinguish from herds as units for household production; also, there are difficulties in counting cattle in the field (Dahl and Hjort 1976).

Formal herd-growth models are based on herd parameters such as the calving and mortality offtake, etc. The aim of the formal herd-growth model is to simulate a cattle or camel herd and sheep and goat flock, with typical age and sex distributions. Into this model various restrictions on growth and changes in the herds are introduced. According to Dahl and Hjort, the assumptions used are: "... the numbers of calves born during each of the last 14 years are equal to each other, ... the mortality rates within each age interval are constant from year to year, so that the age structure is only a result of the normal mortality structure and not an aggregated result of fluctuations in births and deaths in earlier years, [and] ... all those who die within one year die at the same time, i.e., at the end of the year" (Dahl and Hjort 1976:45).

Growth rates based on these assumptions are valid for large aggregates of stock and not for the individual stock owner. According to Dahl and Hjort, a herd doubles in 24 years. Some of the crucial information this model fails to take into account is that:

- The cyclical changes in the size and composition of the family are not included in the model.
- The actual calving rate in any year will vary dramatically from the average, i.e., between 100% and 20%. These variations have dramatic implications for herd growth. If the calving rate reaches 100%, different strategical considerations are implied for different individuals. For a large herd owner these considerations differ from those for a poor pastoralist, as grazing land is communal and livestock individually owned. The large herd owners are usually tribal chiefs, government officials, and traders. As these people have entrepreneurial ability, they convert their capital in herds into other forms of capital. In the case of the Jijigga rangelands, for example, large herd owners started building cisterns for selling water to stock owners and embarked on mechanized farming. Although cisterns were the main investment, opening shops and establishing large-scale farms were other forms.
- Price conditions in the international market affect prices at the local level and for each individual stock owner. Price fluctuations are likely to have different implications for the poor and rich pastoralists. For individuals with small herds, a higher price means that they need sell few animals to satisfy their needs. Sale of animals implies reduction of capital and less security, but pastoral herds are a risky form of capital, owing to natural hazards, diseases, predators, and thieves. The large herd owners, therefore, sell many animals when the price is high, because of alternative investment opportunities in the pastoral sector.
Nomadic pastoralists do not depend solely on animals for their income. Pastoralists sometimes grow crops on marginal land, although they realize a far lower yield than in the agricultural zones. The large herd owners also transfer their capital in herds into grain production on nonpastoral lands. Trading is another source of income for pastoralists. Pastoralists engage in trading activities such as opening tea shops and selling consumer goods. They sell livestock and buy grain for consumption. Some nomadic pastoralists, like the Afar in the northeast rangelands of Ethiopia, supplement their diet by collecting bush foods, i.e., nuts and fruits.

In pastoral lands, drought is a common phenomenon. What happens to stock owners when they are hard hit by drought? A stock owner with few animals will be sloughed off pastoral activities and will have to seek an alternative source of income to be reinvested in animals. Although some members of a family work as labourers, others subsist on the remaining animals, consuming additional foods such as bush fruits. Some pastoralists undertake cultivation, using farming methods that are new to them, with donkeys, camels, and hand tools.

The common models of herd growth do not usually consider these factors. First, the raw data are collected during surveys that may not reflect the reality of herd growth. There is also a scarcity of information on age and sex distribution in pastoral herds. Because livestock surveys are associated with taxation, it is extremely difficult to elicit a cooperative response from pastoralists. The stock owners provide the surveyors with unreliable information. After a drought, if there is ample grazing, a herd can double in 4–5 years according to Dahl and Hjort (1976); however, a herd does not necessarily double in 24 years. The drought reduces the number of animals for household production. Calves and old animals die and, hence, create irregularities in the age structure of the herd. This has a long-term effect on the production of milk and calves.

When there is drought, the market price of animals goes down because there are too many animals at market. As the price of animals decreases, the price of grain soars, as it did among the Afar in 1972–75. The farming population living adjacent to the Afar, to the extent that they had grain supplies, were in the better trading position.

In a year without drought the number of animals utilizing the range increases, and sometimes the increase leads to overgrazing a deteriorating pasture and, hence, decreased productivity per animal — a combination that means less food for the pastoralists. It has been shown by Haaland (1976) that overgrazing is caused by:

- The uses of livestock in a number of social relationships;
- Lack of investment opportunities in or outside pastoral areas; and
- The individuals’ need to maximize their livestock holdings.

Whereas the large herd owner transfers capital from herds to other forms (Ayele Gebre Mariam 1977), the smaller herd owner continues to build the herd, irrespective of the damage to the environment. The reason is that the herd capital is perishable and must be replaced.

During both drought and nondrought periods, the relationships between individual pastoralists must be studied: how individuals act toward each other
and how the whole group acts toward other units sharing the same circumstances. Generally, the weaker lose their grazing rights and water points to the strong groups. Through raids, the weaker group also loses animals. To alleviate the losses from raids, central governments sometimes intervene, but the action does not necessarily provide peace and security in pastoral areas.

According to Dahl and Hjort, Bondestam gives a vivid example of the effects of the Ethiopian drought of 1972–75 by quoting a stock owner in Geshamo town, Ogaden: “Before I had 50 cows, 100 camels and 400 sheep and goats. Now I have only 18 cows and three-quarters of my camels, sheep and goats have died. Next week, I will have only 5 cows. Before I was fairly well off. In two or three weeks time I will own nothing but my house and clothes” (Dahl and Hjort 1976: 115–116). The statement of this stock owner shows that the most significant factor in the pastoral production system is rainfall, which is not constant. Rainfall is by no means inevitable and is not evenly distributed in any year. Rainfall affects the whole ecological pyramid. As a result, mortality, calving, offtake, etc., when based on averages obtained from short-term surveys, fail to describe reality.

A management unit does not depend on only one kind of stock. Stock owners keep cattle, camels, sheep, and goats for complementary purposes. The reasons are that small stock, although more vulnerable to diseases than are large stock, are cash buffers because they have a high reproduction rate; they lactate during dry periods, unlike cattle; goats and camels can survive a drought better than cattle and sheep; and small stock allow more rapid herd growth. A management unit may also grow subsistence crops or trade livestock products for crops when exchange rates are favourable. Stock owners also depend on bush fruits.

Averages are limited in scope. They do not show the systems of relationships because they are derived only from units of population and individuals. Sampling is one of the means of arriving at averages, but it is not necessarily reliable. Leach (1967) quotes from The Disintegrating Village: “... under the present system of paddy cultivation by sharecroppers the landowners have no incentive to introduce any permanent improvements to the land because they do not get the full benefit of such improvement.” Leach writes that the author nowhere considers the many cases where sharecropper and owner are related. In fact, according to Leach’s findings all young men are sharecroppers, and most old people are owners; sharecroppers are the heirs of the owners. This example shows that the quantified indices presented as averages do not show the system of relation but rather present data in isolation, which is likely to lead to wrong interpretations.

- Numbers may not be wrong, but they draw the surveyor’s attention away from what is of crucial significance.
- In some cases, numbers will be presented as averages of averages; these do not reveal the facts.

alternative operations

Some operations are preferable to the calculation of single measurements into averages. Distribution and simulation are better bases for forecasting averages. The distribution mechanism takes care of the highest and lowest herd growth rates and not of the average of the two. A model
showing distribution might include household categories, cattle, sheep, goats, camels, and cropland. In simulation, "the aim is to play out the plan on a computer on a gaining [sic] situation in which some of the game players actively try to thwart the plan" (Churchman 1968:172–173). This kind of test is not an end in itself. Simulation makes use of computers and computer-programing languages. In simulation inputs, alternative methods are provided to produce alternative outputs. The growth rates of cattle, camels, and sheep and goats simulated by Dahl and Hjort are only averages valid for large aggregates of stock. However, the fortunes of an individual herd owner may deviate considerably from the average.

The technique of simulation helps one to see the interrelationships between people, animals, plants, and other factors that affect these, such as the family development cycle, rainfall variability and distribution, alternative sources of income, and markets.

implications of herd projection models

A good example of the implications of the herd-projection models is a livestock development program at Yavello in Borana country. The project area lies in the Arero Awraja of Sidamo province. This range unit has more than a million hectares but is only grazed in the wet season. The main objective of the program is to develop the livestock sector so that it earns foreign exchange and increases the size of the tax base.

Grazing permits are issued annually and are renewed for stock owners who abide by the management regulations. No one is allowed to graze stock in the area without a grazing permit. Grazing permits are issued to those stock owners who traditionally have exploited the area. Stock owners have to pay an annual fee for the permit, and the fee covers government costs for water facilities and other services. The annual fees will increase as grazing in the project area becomes profitable.

A range management unit was established. This unit divided the area into 16 ranges. Each range was further subdivided into four grazing areas that are grazed for an average of 3 months each year. Each range has three patrols who guard the areas not being grazed against trespassers and fire. Each range also has sources of water adequate for a year.

A stockpond was constructed. As the stockponds were completed, many more livestock were to be grazed in the area, so that there would be room for an increase in the number of people. The other components are animal health measures and marketing. According to the plan, export markets for beef must be given the highest priority.

The models used in preparing this livestock project are noteworthy. Before the project — the Range and Livestock Development Project — the annual offtake was 2–3%. This low offtake was attributed to low production and not to cultural factors, such as the extent to which the Borana are disinclined to sell animals. Animals reach maturity slowly: females calve at 5 years; males require 5–8 years to reach marketable size. The calving rate was thought to be 60%. Of the calves born, 55% died of disease or starvation within 1 year. Thereafter, marketing rates were about 10%.

To understand this traditional production system, the planners formulated a "composite" herd. They used 100 cows as a base in theory and postulated that the herd produced 60 calves a year. Other assumptions were
Table 1. Composite herd by age and sex based on mature cows before the project.

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>Females</th>
<th>Age (y)</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>5−15</td>
<td>100</td>
<td>5−15</td>
<td>4 (bulls)</td>
</tr>
<tr>
<td>4−5</td>
<td>8</td>
<td>7−8</td>
<td>7</td>
</tr>
<tr>
<td>3−4</td>
<td>10</td>
<td>6−7</td>
<td>7</td>
</tr>
<tr>
<td>2−3</td>
<td>12</td>
<td>5−6</td>
<td>7</td>
</tr>
<tr>
<td>1−2</td>
<td>17</td>
<td>4−5</td>
<td>8</td>
</tr>
<tr>
<td>&lt;1</td>
<td>(30)</td>
<td>3−4</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2−3</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1−2</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;1</td>
<td>(30)</td>
</tr>
</tbody>
</table>


that 55% (33) calves die before reaching 1 year of age; 20% die before reaching 2 years; an average mortality of 10% occurs annually before 5 years of age; at least half the deaths are of females, which would normally have been kept for replacement; one male is kept as a herd bull, leaving seven males aged 5 years (Table 1).

The total herd, excluding calves, is 215, and male animals for market or consumption account for offtake at 3.25%. These assumptions were arrived at before the implementation of the project and served as the basis for project preparation. In other words, this kind of model was used to depict herd growth. There are some facts that these herd projection models fail to show.

First of all, the model does not explain what a herd is. Planners took 100−125 animals known to graze in the wet season, excluding calves. However, the question of who owns the herd is important because different pastoralists each have their own strategic considerations as regards the sale or slaughter of their animals. When planners state that the calving rate is 60%, what does it imply? Here again the different strategic considerations of poor and rich pastoralists have to be taken into account. In droughts, for instance, the figure of 60% would be meaningless.

The planners of this project believed that the average nomadic cattle owner has about 40 animals, including males and females, 1.5 of which annually reach the age of 5 years for sale. Income does not exceed $112.50 when the price of a marketable animal is $75.00 (National Range Development Project 1969). However, the income of a stock owner not only consists of the cash from the sale of animals but also includes all the animal products (milk, cottage cheese, hides, etc.). When one looks at the family development cycle, the variations are enormous, just as they are for the average herd.

What is expected of the project? The planners have forecast that animals will mature at age 4; that is, females will calve at the 4th year; the age at which animals are sold will be reduced from 8 years to 5. They also expect calf mortality to be reduced from 55% to 10%; adult mortality will be reduced to 3% annually.

The impact of the project objectives on the composite herd after the implementation of the project can now be studied (Table 2 and 3) (National Range Development Project 1969).

The figures show that the offtake is 20% instead of 3.25%. The first preproject model was based on assumptions, and the second model (after
Table 2. Composite herd by age and sex based on 100 mature cows after the project.

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>Females</th>
<th>Age (y)</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>6</td>
<td>&gt;4</td>
<td>5 (bulls)</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>4</td>
<td>21</td>
<td>&lt;1 (calves)</td>
<td>(30)</td>
</tr>
<tr>
<td>3</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 (calves)</td>
<td>(30)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

the project) is still based on them. One question is for whom is the offtake 20% — a large herd owner or a small herd owner. Marketing conditions are dictated by factors outside the pastoral sector, including the processing plant at Melgue Wondo and the international market price. The number of animals marketed depends on the price of grain, which the pastoralists consume to supplement their diet. Grain is available from the Sidamo highlands.

According to the plan, to achieve the 20% offtake, pastoralists have to be forced, if necessary, to sell bulls at 4 years of age. Consequently, herd growth is controlled but not population growth, with the result that there would probably be less food for consumption.

After the implementation of the project, it was anticipated that by the 6th year the number of cattle in the Yavello unit would double, and the age and sex distribution would be very close to the ratios of the composite herd. In reality this did not happen, as there was drought in the 4th year of the project. Although the initial assumptions may have been as accurate as possible, the conclusion was wrong owing to circumstances that could not be taken into account in advance.

**effects of the project in reality**

No evaluation was carried out for the project, and, consequently, these impressions are purely subjective. The project was never fully implemented. The stockponds were constructed, but there was no water-control mechanism. Animals came into the ponds to drink instead of being provided with water in a trough. The traditional practice of watering animals was not implemented. As a result, the ponds looked muddy and dirty. Among the Borana, wells are owned by individuals and are said to belong to the head of the clan. According to the custom, members of the clan to whom the wells

Table 3. Annual sales from the same composite herd, after the project.

<table>
<thead>
<tr>
<th>Females</th>
<th>Males</th>
<th>Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cull heifers (2 years)</td>
<td>3</td>
<td>Steers</td>
</tr>
<tr>
<td>Old cows</td>
<td>20</td>
<td>Old bull</td>
</tr>
</tbody>
</table>

belong have access to them. However, it appears that some clan members are excluded, whereas members from outside are occasionally included. The basis for this is that well management is controlled by a well council. To have access to the well, one must have political support and must participate in the tasks of the well. Because watering livestock is a labour-intensive activity, each stock owner has to have enough labour to manage the animals. Herd growth is balanced with the increase in labour input (Helland 1979). The stockponds freed labour to take on other activities in herd management so the size of the herds could be increased. Even in cases where troughs were built, watering did not require a large labour force. As a result, probably both the human population and the livestock population increased and the range was depleted.

The construction of stockponds attracted stock owners from distant places during the dry period. Hence, the Yavello project area was overgrazed — a fact that probably meant less productivity per animal and less food for the stock owner. Most of the stock owners stopped moving their animals to the dry-season grazing areas and utilized the Yavello pasture all year round. The Gujji from the northern part of the project area were attracted, and the number of animals was more than had been anticipated.

The idea of grazing permits was not accepted by the pastoralists, and the marketing system was not implemented. The overall result of the Regional Livestock Development Project was overgrazing created by an increase in the bovine and human populations. After the implementation of the project, livestock numbers failed to remain constant through the sale of stock. The small herd owners sold few animals to fulfill their basic subsistence needs, even when the price increased. Among the Borana, I observed that even large stock owners sell few animals as the price rises. Their interest is to build up stock numbers. In the end, there were more animals than the range was able to support. Households require a certain number of animals to be viable, and viability is seen in terms of the amount of labour in the household in relation to its means of subsistence. It appeared from the project that there was an excess of household members in relation to the number of stock available for subsistence. Although the number of households was growing, the project does not seem to have formulated any plan to skim surplus households and relocate them in other sectors of the economy.

Up to now Africa livestock projects have not been successful, as the Borana case clearly shows. The alternative is to embark on a range management program in which wet- and dry-season pastures are demarcated, and, perhaps, range associations set up, based on the traditional users of an area. A range association would have its own water supplies and would control the seasonal movement of people and livestock. The dry-season grazing could be closed during the wet season. These measures may be expected to increase the range resources. All the inputs of a livestock development project, such as veterinary services, access roads, marketing, water development, supplies and services programs, etc. should be introduced. However, as a result of these new inputs, the livestock population will grow — a fact that will result in overgrazing, lower productivity per animal, longer calving periods, and so on.

A balance between herd and population growth could be maintained if a kind of progressive taxation were imposed on the pastoralists, forcing them to sell animals. Pastoralists should be charged a fee for veterinary services,
water supplies, and other services rendered, according to the number of animals they own. The increase in the human population should be planned for and relocated in other sectors of the economy. In this case, consideration of the economy of the country is indispensable. Both measures require a political move at government level (personal discussions with Haaland). Even this kind of planning does not take care of the drought phenomenon, which is extremely difficult to control.

In sum, quantitative data fail to take into account the social, economic, and environmental factors affecting a production system, and so modeling based solely on quantitative data is inadequate.

**discussion**

_Sandford:_ In pastoral areas, large fluctuations, in rainfall for instance, make firm planning forecasts impossible. However, the inutility of quantitative data for making forecasts does not imply that quantitative data are useless. Partial analysis, in which changes in one element are analyzed on the assumption of _ceteris paribus_ in other elements, is a useful tool.

_van Drunen:_ Project staff should not be lured by sophisticated large-scale data collection but rather choose small-scale qualitative surveys. The first type are so expensive that finances will not be available for the second type.
relevance of the past in projections about pastoral peoples

Daniel Stiles, Department of History, University of Nairobi, Kenya

The major problem confronting pastoral peoples does not require belabouring: it is environmental degradation and, in its final stages, desertification. This problem has been dealt with at length elsewhere; however, two main questions related to this problem, have yet to be satisfactorily answered. They are: What are the causes of desertification? How can the process be halted and even reversed?

It is in providing answers to these questions that I believe a knowledge of the past has a crucial role. Desertification, if it is allowed to continue, will result in the destruction of many pastoral societies and in the disappearance of this mode of production in environmentally marginal areas of the world. The process that finally results in deserts leads also to the creation of increasingly larger environmentally marginal areas. Pastoralism is probably the most adaptive and potentially viable economic system in semi-arid and arid land ecosystems, but it requires rational and long-term approaches to land-use management. Most pastoral peoples have been engaged in livestock management for centuries, if not millenia, and as a result have developed sophisticated adaptive strategies. Are the adaptive strategies rational? By rational, I mean, are they balanced between systems that, barring outside detrimental influences and allowing for normal social and economic change, will result in the continuance of the system indefinitely?

objectives

Some stated objectives of governments and institutions for dry lands occupied mainly by pastoralists are to make pastoral societies self-sufficient and to develop their livestock practices so that they will contribute to the national economy; to maintain the social and cultural integrity of pastoral societies under conditions both of socioeconomic change and of ecological stress, which, with the advent of governmental and international famine relief programs and nontraditional options, e.g., urban migration, break down traditional patterns of response and organization; to find direct solutions to the most urgent environmental problems associated with desert encroachment and ecological degradation; and to establish systems of land use and range management that will allow long-term pastoral exploitation of natural resources without serious environmental degradation.
background

What has been done so far toward discovering the major causes of desertification, ways of combating it, and producing an understanding of traditional pastoral systems of livestock and range management? The answers to this question depend on the philosophy or ideology of the person suggesting them. At the risk of overgeneralizing, however, I think there are two opposite positions. The first position is often associated with natural scientists (ecologists, botanists, etc.), though many economists also support it, e.g., Konczacki (1978). It maintains that traditional pastoral practices are not rational in the long term and are the principal causes of environmental deterioration and desertification. The second position is usually espoused by social scientists, particularly anthropologists (or by natural scientists with practical experience with pastoralists), and it holds that desertification is caused by many factors: natural disasters such as drought or long-term climatic deterioration, restriction of natural pastoral movement patterns by colonial or independent governments, and artificial concentrations of high-density populations resulting from the creation of permanent water sources (boreholes, basins) and by the establishment of permanent health, education, and commercial centres, often associated with administrative posts. This position maintains that, under natural conditions, traditional pastoral practices are rational.

Deciding on which of these positions is the most accurate has important implications for policy planning for the future of pastoral peoples. Although most researchers concerned with pastoral studies are familiar with the arguments of both positions, or ideologies, I think it is useful to explore them in more detail, to make explicit the primary contrasting points and to illustrate how the divergent ideological positions are relevant to the orientation of future planning efforts. There is certainly no clearcut division of ideology according to one's profession (nor a uniform ideology within either position), but for simplification and ease of reference I term these two viewpoints as the natural science position and the social science position.

the natural science position

The proponents of the natural science position hold that livestock are inherently deleterious to the environment. A number of studies have been conducted comparing the efficiency of environmental utilization between livestock and wildlife (Darling 1956; Ledger 1968; Talbot 1963). They have concluded that camels, cattle, sheep, and goats often have a negative effect on the environment. The animals upset the balance maintained by a succession of wild grazers by utilizing only a few species of the available plant food supply. Darling (1956) has argued that pastoralism, unless highly nomadic, can only destroy the habitat. Brown (1963:111) concurs, saying: “No example is known in East Africa of hitherto unused land opened up for grazing which, in the absence of... controls, has not degenerated or is not degenerating into an eroded waste.” The Worldwatch Institute has said the future of the world environment is bleak and has placed the onus for desertification directly on human beings. It says “...one might more accurately think in terms of the desert being pulled outward by human actions. Where desert edges are moving outward, moreover, the process seldom involves the steady influx of a tide of sands along a uniform front;
rather, climatic fluctuations and land-use patterns interact to extend
desert-like conditions irregularly over susceptible land” (Eckholm and Brown
1977).

Once vegetative cover is reduced by overgrazing, fire, and the felling of
trees and bush for firewood and boma construction, hydrologic and soil
deterioration set in. Rain is not absorbed as readily into barren or sparsely
vegetated land, and moisture evaporates more quickly from it; rainwater runs
off the surface, taking with it the topsoil, containing nutritive organic matter.
Eroded soils continue to degenerate from one season to the next, the area’s
water table falls, as less rainfall soaks in, and the springs, streams, and lakes
dry up.

There are suggestions that reduction of ground cover associated with
desertification has a synergistic or even feedback relationship with climatic
deterioration (Kates et al. 1976; Eckholm and Brown 1977). One theory
holds that stripping land of vegetation increases surface reflectivity, which
reduces rainfall over a localized area (Charney 1975; Hare 1976), and
another suggests that rising atmospheric dust levels over a wind-eroded
terrain also discourage rainfall (Bryson 1973). If there is some synergistic or
cybemetic relationship between reduction of vegetation and climatic
deterioration, then desertification is the product of human actions.

The principal causes of desertification derive from human beings’
demands upon the environment that exceed the natural regenerative
capacity of the land. Increases in population and domestic animals are
blamed in the pastoral areas where population exceeds the carrying capacity
of the land. When climatic deterioration is particularly intense, such as the
Sahelian drought of 1968–73, the effects on both the human population
and the environment can be catastrophic and irreversible (Académie des
Sciences d’Outre-Mer 1975). Human actions and periodic dry spells have
forfeited an estimated 650,000 km² of land once suitable for agriculture or
intensive grazing to the Sahara over the past 50 years along its southern
fringe (United States Agency for International Development 1972). Lamprey
(1975) found after comparing aerial photos taken in 1975 with maps
prepared in 1958 marking the limit of scrub vegetation in the Sudan that the
desert had expanded by an average 90–100 km in 17 years. The
Worldwatch Institute has concluded that a collective area larger than Brazil
with more rainfall than that received in lands classified as semi-arid has been
degraded to near-desert by human activities. This estimate does not take into
account the desertification that has taken place within arid or semi-arid zones
(Eckholm and Brown 1977).

the social science position

The social science position is more difficult to characterize because there
is more variation within it. I suggest, however, that one of its central tenets
revolves around the notion that one has to view each pastoral society and its
situation as a unique phenomenon to be analyzed in its given context. It
maintains that generalizing about the pastoral mode of subsistence in purely
economic or ecological terms is reductionist and cannot provide an
understanding of distinct pastoral systems that have evolved to deal with
particular environmental and social situations. The social scientist concludes
that, once one understands how pastoral systems operate, one comes to
appreciate their rationality and effectiveness in dealing with both external
factors of the environment and internal factors of controlling, regulating, and 
distributing the means and fruits of production. This conclusion leads to 
subsidiary beliefs; one is that desertification is a result not of normal pastoral 
practices but of pastoral systems operating under abnormal conditions, these 
conditions being primarily the result of political decisions made by 
governments or agencies. The political decisions disturb the traditional 
pastoral system in a variety of ways but almost always involve restriction of 
movement or land alienation. Pastoralists are being forced to exploit 
marginale land because better-watered land is being put under cultivation 
(usually with export and not subsistence crops) because agriculture is seen as 
more productive by most governments and international economic assis­
tance agencies. Sometimes, land that once formed a part of the seasonal 
grazing system is turned into a national park for tourism development, 
dry-land farming, or whatever. Therefore, poor land-use practices by 
pastoralists are a result of development and modernization, not of traditional 
pastoral systems. Another subsidiary belief is that traditional pastoral 
concepts of environmental and livestock management should be taken into 
consideration by policy planners. The lack of such consideration in the past 
has led to the failure of most programs aimed at halting environmental 
degradation and at developing a successful market economy for livestock 
products. This opinion has been argued strongly by Johnson (1980) in a 
Conference on Desertification, held in Nairobi in 1977. Land, and not 
people, was the primary focus of attention in the proposed recommenda­
tions.

Social scientists, particularly anthropologists, tend to see the entire 
problem of development and environment somewhat vicariously through the 
eyes of whichever pastoral society with which they happen to be familiar and 
generalize to problems affecting all pastoralists. Demographic problems are 
recognized but often are said to be exacerbated by political restrictions on 
natural population geographic expansion. Population numbers and density 
are not always viewed as nefarious; for example: "There are, however, many 
compensating mechanisms that can lead to population increase with little 
increase in ecosystem damage" (Kates et al. 1976:20).

comparison and contrast

I have probably deeply offended both natural and social scientists, but I 
maintain that I have accurately, if incompletely, represented their views — 
the ecologists viewing pastoral systems in the long term as irrational and 
social scientists viewing them as rational.

The two groups, however, agree that desertification exists and it is a 
serious problem; high population numbers and density are almost always 
seen as bad by natural scientists, whereas social scientists often defend and 
rationalize their existence; natural scientists offer solutions to desertification 
and social scientists offer little concrete but criticize the natural scientists; 
social scientists stress political actions in recent times as the main cause of 
problems affecting pastoralists; natural scientists stress ecological factors; 
both stress political solutions, but natural scientists call for political will by 
governments to entice pastoralists into what they perceive as rational 
practices, whereas social scientists imply that political institutions must come 
to grasp the complexities of pastoral systems before solutions can be
proposed and implemented. Oddly enough, neither position supports a view of climatic deterioration as being particularly important or relevant as a cause of desertification. I suppose the reason is that this approach would detract from their respective arguments that pastoral practices are to blame or that political actions are the culprit, and, besides, it seems like such an obvious and simplistic explanation. One of the main contrasts between the two positions is their respective understandings of desertification and what it implies. Natural scientists see it as a crisis that must be halted and reversed as quickly as possible, whereas social scientists tend to see it as an inherent part of human use of arid and semi-arid areas. The latter maintain that one must accept desertification and learn to reduce its consequences (Kates et al. 1976) rather than reversing the physical symptoms of desertification.

I could go on, but enough has been presented for my particular case to be argued. What is missing from both positions is an understanding of the past to place the present in perspective. Pastoral societies in many parts of the world are today experiencing serious difficulties, and the recent drought in the Sahel has served to focus attention upon them. There are important questions to be answered. Are these difficulties recent phenomena? If they are not, how many are attributable to long-term climatic deterioration and how many are the result of long-term overexploitation of environmental resources by humans and their beasts? Are the droughts experienced in historic times part of normal climatic fluctuations, or is society entering a period of continuous climatic deterioration? Can one legitimately conclude that desertification is caused by recent political decisions and the resultant economic dislocation of traditional pastoral systems?

To resolve these questions, one needs data on the interrelationships of demographic, economic subsistence, and environmental change in relation to climatic change before and since the adoption of pastoralism as an economic subsistence base. I think that one of the reasons that the data have not been gathered by people concerned with problems of desertification and pastoralists is that the methods and aims of obtaining relevant data are not part of the usual research interests nor do they form part of the underlying theoretic basis of the areas of study of the workers involved. Whether they are aware of it or not, however, both social and natural scientists can make important contributions to a study of the past that will provide the information necessary to put the present into perspective and that will allow a much more accurate assessment of how and why pastoralists and the environment are the way they are today. Both branches of science have accumulated an impressive body of data describing and analyzing social, economic, and ecological systems and how they articulate and interact, but, as all are aware, none of these systems are static. They have long histories and, in terms specifically of pastoralism, these interrelated systems have been undergoing continual change for centuries or millenia. The climate and the environments inhabited by pastoralists have also been changing. Today is a tiny slice of time in this continually changing pattern of human and ecological relationships; today is a product of actions and forces begun long ago. In my opinion, it is misguided, at best, to suggest that the environmental wastelands and the resultant human suffering are directly the consequence of political decisions made within the last 50 or so years. Poor planning and bad decisions, regardless of motivation, have certainly aggravated the situation, but I believe that circumstances roughly analogous to the Sahelian drought
have occurred in the past long before the advent of colonial administration. To deal effectively with the current situation inherited from the past, one obviously needs better land-use planning than has been demonstrated in the Sahelian zone and other parts of the world. For the long-term future one needs information on the long-term past to gain an understanding of how best to plan for change that fits natural social patterns of transformation and how this transformation is likely to affect the ecology upon which people, plants, and animals depend for survival.

implications for policy planning

The ideology of planners has important implications for programs of economic development and ecological regeneration of pastoral peoples and lands. If planners take the view that desertification is caused by irrational land-use patterns, then they will depend more heavily on technical experts proposing change from the "top-down approach" discussed by Johnson (1980:7). Their focus will be primarily on land and how people can be manipulated to extract as much economic profit from it as possible; the risk is that they will overlook appropriate concerns, fail to plan for what is to be done with the new fruits of productivity, and evade the question of how the changes will inevitably effect new social relationships and formations. The land will be saved and a society's institutions, culture, and way of life will be sacrificed for it.

If planners take the social science position, they will base their plans on traditional technology and practices, and, where these are not appropriate for the adaptations needed, they will encourage indigenous methods of attitude change to effect the acceptance of modern technology. The social science position is that solutions to problems are to be planned and implemented as much as possible within the existing traditional framework of adaptive responses to stress and that political decision-making bodies must respond to this corpus of knowledge (obtained from the peoples themselves via social science research), rather than impose decisions without reference to it. The major drawback of the social science position is that it does not come to grips with ecological reality and, thus, may be seen as a formula for human disaster.

research priorities

To give a specific example of the type of research that I think is important for the future, I shall present an abbreviated version of the introduction to a research proposal recently drawn up that focuses on the arid regions of northern Kenya, although I will not cite the references. The life of humans in East Africa has undergone monumental change in the last 10,000 years. Earlier, hunting and gathering were the only modes of economy and subsistence, and archeological and ethnographic evidence suggests that social organization was restricted to the band level. People lived in small, kin-related groups and moved often in search of game and plant foods. Settlements were small and temporary, leaving few archeological traces. Because of social, ecological, and environmental constraints, human population was kept at a certain level, well within the numbers that the land could support.
Approximately 12 000 years ago, East African lakes began to rise in level, reaching a maximum height 10 000 years ago. The level of Lake Turkana was 75 metres higher than today and had grown to twice its present volume. These rises were the result of an increase in precipitation at the end of the Pleistocene era over a broad region of north-central and eastern Africa. Archeological evidence shows that humans in the northern East African Rift Valley lake region had developed a fishing-oriented economy by at least 7000 years ago and that population began expanding, with more permanent and larger settlements. There followed a period of climatic fluctuation, leading to a reduction in humidity to present levels by approximately 2500 years ago. During this period, beginning about 6000 to 5000 years ago, East Africa witnessed the introduction of pastoralism, which was to have a profound effect on the way of life of the human population, the biota, and on other features of the environment.

The purpose of the project proposed here is to study the history of the interrelationships between environmental change and human social, economic, and demographic change over the past 10 000 years, and how this history relates to the present and future of humans in northern Kenya.

This project has relevance from both an academic and a practical standpoint. In the past decade, a great amount of interest has been shown by students of both the social and the natural sciences for the development of an understanding of human—land relationships. An understanding of these relationships has become critical in a world of dwindling natural resources and growing population — the survival of people in many environmentally marginal parts of the world may depend on it. Northern Kenya is one of these environmentally marginal areas. As a result, research projects have begun to study aspects of problems associated with environmental degradation and desert encroachment and features of human ecology and social organization relevant to the improvement of land use and management. The Integrated Project in Arid Lands (IPAL) of UNESCO and the Federal Republic of Germany is an example.

Without knowledge of the environment and history that resulted in the features of human population to be studied: demography, ecology, and economy, there is no basis for sound policy of economic and social development and land-use management for northern Kenya. For example, there has been a debate as to whether desertification, which has obvious serious consequences for population change, is due primarily to climatic deterioration or is rather more a result of human activities. Desertification has occurred in the Sahara in the last 5000 years, and it is occurring today in the Sahel, parts of the Sudan, and in northern Kenya to name but a few regions of Africa. The Sahara 5000 years ago was a savanna grassland containing lakes, streams, and all of the fauna associated with a normal African savanna. The Saharan region has undergone climatic fluctuations involving desiccation in the past without turning into a desert. Is it just a coincidence that desertification occurred this time soon after archeological evidence of widespread pastoralism in the Saharan region? Is desertification inevitable, or can human beings stop or even reverse the process?

Two alternative models can be offered to explain the process of desertification. Data will be gathered by this research study and acquired through collaboration with other research projects and publications to find which model the data best fit. If one of the suggested models corresponds to
the data, the government of Kenya will have sufficient understanding of the processes to introduce programs to deal with environmental degradation in the most viable way. Integrated with the results of anthropological and economic studies, the data will serve to influence policy planning for the socioeconomic development inevitable for northern Kenya.

In simplified form, the models comprise three main variable classes: climate, environment (affecting life support), and human population. The most important variables within climate are humidity and temperature; within environment are vegetation, fauna, hydrology, soil, and disease vectors; and within human population are numbers, density, and distribution.

Another variable, that of domestic animals, can be viewed as a fourth class, but it is subordinate and dependent on both environment and the human population for survival. There are different ways that this variable class can be viewed in the total ecological system.

model 1: deterministic

In the first model, the human population continually strives to maintain an equilibrium with the environment. As the climate changes so do environmental variables. In response to these climatic and environmental fluctuations, the human population adapts, decreasing or increasing in number as natural resources allow. Population grew markedly when fishing was possible in the area and when domestic animals were introduced and food supplies became greater and more stable. Human and domestic animal populations today, as in the past, increase during periods of humidity and decrease during periods of drought. This pattern should continue as long as the climate undergoes no serious deterioration, and pastoral systems are not constrained by political actions.

This model assumes that humans' adaptations are rational and the most viable for ensuring survival. Proper land management is an acquired skill of the people because of their extensive experience and knowledge and also because of need — improper use of the land would lead to disaster. Therefore, human population variables respond in relation to climatic and environmental variables.

model 2: the human factor

The second model sees humans and their activities as having a larger potential effect on environmental variables, depending on the economic subsistence system and technology employed. At low levels of technological sophistication of hunting—gathering and fishing economies, the environment can support the population. The acquisition of a pastoral economy introduces a new dimension to humans' interrelationships with the environment; they are no longer alone in extracting environmental resources; their domestic animals also take part. A pastoral economy results in a new order of social organization and relationships and a demand for personnel to handle labour-intensive tasks. The system causes human populations and the subsidiary animal populations to grow until equilibrium with environmental variables capable of supporting the system is reached. This is in contrast to the pattern of hunting—gathering peoples in which population growth is regulated and maintained below the carrying capacity of the land. The growth of human and domestic animal populations, which are striving for
maximum size, begins to reduce the environment’s capability to support it. Vegetative cover is reduced by grazing and settlement construction, which in turn affects hydrology and soil. The local fauna is reduced by human needs for land and water use.

Pastoralism began in northern Kenya during a particularly favourable period of climatic humidity, available surface water, and vegetative cover. Population increase continued while the climate deteriorated, putting extreme pressure on the environment. Eventually a point was reached when the environment began to degrade, when periods of regeneration did not equal periods of degeneration. The influence of humans and their animals in a marginal environment becomes equal to or greater than the climate as a factor affecting environmental variables. Under these conditions a normal microfluctuation of less than average rainfall (drought) has severe repercussions on the human and animal population as well as accelerating environmental degradation.

discussion

Horowitz: Biologists are far less agreed about environmental degradation and the contribution of pastoralism to desertification than Stiles’ paper implies. There are solid data to show that Sahel–Niger forage quality is unchanged over 20 years of heavy grazing. Anthropologists in the Sahel have pointed to heavily grazed areas in which the graze value is comparable to subclimax vegetation. Around boreholes, grass completely returns if left for a year — a fact that suggests resiliency rather than fragility. So, perhaps herd owners are not so destructive. Desertification is a phenomenon that requires long runs of data to be judged.

Stiles: How then do you explain the Sahara desert? It was a tropical savanna 5000 years ago. The origin of pastoralism in the Sahara coincides with desertification. Is this just a coincidence?

Horowitz: Pastoralism is much more recent in origin, probably within the last 1000 years in that region. There is no evidence for the existence of pastoralism 5000 years ago.

Stiles: Carbon-14 dating shows pastoralism in existence 6000–7000 years ago in the Sahara, 3000 years ago in the Sahel. There are recent, still unconfirmed data to show that pastoralism may have been present in Kenya 20 000 years ago.
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