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ANIMAL PRODUCTION AND RESEARCH

IN TROPICAL AFRICA

Report of the Task Force commissioned by the African
Livestock Sub-Committee of the Consultative Group on
International Agricultural Research



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September, 1972

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L.J.C. Evans, Esq.
Chairman, African Livestock Sub-Committee
Consultative Group on International Agricultural Research

Dear Mr. Evans,

We have pleasure in submitting our Report on Animal Production and Research in Tropical Africa, prepared on your instructions for consideration by the Consultative Group and its Technical Advisory Committee.

You will see that we recommend that:

- an International Centre for the Development of Animal Production in Tropical Africa should be established immediately;
- the main focus of its activities should be a multidisciplinary research study of existing and new systems of animal production, supported by the documentation and dissemination of all available information, and the training of scientific and planning personnel;
- the major part of its research should be carried out in co-operation with existing national and regional research stations;
- it should preferably be located in Addis Ababa, with such associated field stations as may be necessary.

Our visits and discussions in Africa left us in no doubt that an international research input would usefully encourage and support the increased efficiency and output of animal production which Africa so sorely needs. Throughout the Report you will find an emphasis on the need for integrated research involving the complex of environmental, biological, social and economic problems which currently combine to restrict both the rate of livestock development and the application of improved technologies. The rate of progress resulting from research is

necesssarily likely to be slow. Certainly it would be unjustifiably optimistic to think in terms of specific research "break-throughs" or any development in the African livestock industries comparable to the "green revolution" which has occurred in the wheat and rice production of certain countries.

Although we wish to avoid misleading optimism and to emphasize the inevitable differences between animal and crop research, we do not mean to be in any way hesitant or pessimistic. Rather we wish to stress that "winds of change" are blowing through Africa's livestock industries. Developments which only a short time ago would have been considered impossible are now gathering momentum.

The difficulties which remain must nevertheless be recognised. Not only are there climatic limitations to increased animal production but also the rate of human population increase continually imposes new limits to the realization of development goals. Furthermore, the acute shortage of trained African staff often makes it difficult to maintain even the present efficiency of technical services; while restricted communications and generally low levels of education impose their own inevitable limits on the rate of progress.

Yet, on the other hand, the veterinary services of many countries have achieved outstanding progress in controlling major animal diseases. In many localities the water resources are being developed and marketing facilities are being improved. Of most significance has been the readiness of many governments to give appropriate priority to the livestock industries in their national development plans and the preparedness of the livestock owners themselves to respond to technical and economic pressures and appropriate incentives.

Much remains to be done but there are grounds for believing that change has started and that the rate of progress will be maintained. This progress will not be easy but it could be made less difficult if there was an international centre to offer the type of support which we advocate.

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The suggestion that there should be an international centre was welcomed in principle by most of the African governments and officials we met. Nevertheless, many of them were concerned that such a centre might either try to impose its views on national policies or would attract to itself the staff and financial support which might otherwise have strengthened national research programmes. We have done our best to allay these genuine and understandable fears which we feel bound to draw to your attention.

The success of the proposed Centre will depend upon the extent to which it gains the confidence and cooperative participation of the African authorities. To encourage this cooperation these authorities must be convinced that the establishment of the Centre will not only lead to the continuation of support for their national endeavours but that it will also lead to increased support, as has resulted, for example, from the work of CIMMYT and IRRI.

African governments must also be encouraged to feel that they have an effective part to play in deciding the policy and priorities of the Centre. Although we have suggested that there should be adequate African representation on the Governing Board of the Centre, the exact nature of the Board's responsibilities in relation to those of the Consultative Group and its Technical Advisory Committee has yet to be resolved. We appreciate that this matter is relevant to all international centres and we now refer to it because it is a question of concern in some of the countries we visited.

We would like to suggest that it would be helpful if the African authorities, who were all most generous in giving us advice and assistance, were kept informed concerning the outcome of our mission. Perhaps it would be possible to circulate this Report or a summary of it, together with an account of the decisions of the Consultative Group, to the African authorities most concerned.

It is a pleasure for us to acknowledge the advice we have received in various specialised areas from the following consultants:

- | | |
|----------------------------------|--|
| Dr. K.V.L. Kesteven (Australia) | - Animal health and production |
| Dr. H.F. Lamprey (U.K./Tanzania) | - Wildlife research and multiple land use |
| Dr. P. Nderito (Kenya) | - Education and training in East Africa |
| Dr. L. N'Diaye (Senegal) | - Education and training in Francophone Africa |
| Prof. V.A. Oyenuga (Nigeria) | - Education and training in Anglophone West Africa |
| Mr. J. Tyc (France) | - Economics and marketing |

The views and information they have provided have contributed much to the thinking of the Task Force and to the recommendations of this Report.

Finally, we would like you to know how excellently we have been supported by the staffs of the IBRD and the UNDP. The arrangements made on our behalf were admirable and it was clear that the authorities we visited also appreciated the cooperation and efficiency of the Resident Representatives of the UNDP. Without their help and the unreserved backing of the IBRD our task would have been much more difficult and far less enjoyable.

Yours sincerely,

Barry Nestel
D. J. Pratt

M. Thome
Derek Tribe

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CHAPTER ONE

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

1. The present level of animal production* in Africa is well below its potential. On grounds of economic growth, human nutrition and welfare, trade balances and the conservation of deteriorating rangeland resources there is an urgent case for trying to secure its improvement.
2. The main impediment to development is not merely the lack of technical knowledge. A considerable fund of knowledge has resulted from several decades of work at numerous research centres. Moreover, these existing national and regional centres provide most of the facilities necessary for the future research activities which are needed.
3. Although the results of much of the past work are not widely known and present research activities are limited by shortages of experienced staff and supporting funds, the primary cause of the disappointing growth in animal productivity in tropical Africa has been the failure to integrate the biological, economic and sociological components of research and development programmes.
4. In particular there is a need for more detailed study of animal production systems of tropical Africa before existing knowledge can be fully utilized or future research priorities defined. This work must give full consideration to those aspects of biology, economics and social anthropology that relate to animal production.
5. Several African authorities are now seeking to adopt a multi-disciplinary approach to livestock development and some hopeful programmes are now being implemented. However, the rate of progress is limited by the availability of appropriate information and of multidisciplinary teams of scientists.

Note: Throughout this Report the term "animal production" is used in the wide sense defined in the second paragraph of the Terms of Reference on page 6.

6. This situation has led the Task Force to conclude that an International Centre for the Development of Animal Production in Tropical Africa would be justified provided it is given a limited and carefully defined objective.

7. In essence this objective should be to identify means of increasing the efficiency of the major animal production systems of tropical Africa and to assist the governments and authorities responsible for achieving new levels of productivity.

8. In working towards this objective the Centre will need to analyse all existing information, collect new survey data and participate directly and indirectly in an expanded programme of multidisciplinary and integrative research. Special attention will need to be given to analysing ongoing livestock development programmes.

9. In particular, it is recommended that the Centre should:

- retrieve, assemble and make available in both English and French all relevant information on animal production in tropical Africa;
- engage a multidisciplinary research team to study existing animal production systems; develop new or amended systems of production, and define other research priorities;
- support, supplement and cooperate with existing national and regional research stations in developing a fully coordinated programme of research which is related appropriately to the urgent needs of livestock development;
- develop the capacity to undertake specific research programmes which are appropriate to an international centre. Such programmes will require careful justification with particular emphasis given to their timing and to their international application;

- provide, or assist in providing, seminars, technical conferences and training courses for staff engaged in livestock research, extension, planning and production, in order particularly to increase regional competence in the multi-disciplinary 'systems' approach to livestock research and development; and
- make available statistical support, information or advice to national, regional or international authorities in the various fields relating to animal production in which the Centre is actively engaged.

10. This approach - which both strengthens ongoing activities and provides an adequate coordinating mechanism - would be preferable to such possible alternatives as concentrating all activities at one central station or of using all additional resources for the support of existing national stations.

11. Seven locations were considered for the headquarters of the proposed Centre and Addis Ababa is recommended as the most suitable.

12. The development of the Centre has been proposed in two phases. During the first phase (years one to three) efforts will be concentrated on the analysis of animal production systems and related programmes of documentation and training. Towards the end of this phase a programme of cooperative research with existing national or regional stations will be started. Subject to scientific review towards the end of Phase One, the second phase (years four to eight) will develop further the programmes initiated in Phase One, particularly the cooperative research programme.

13. The closest possible liaison should be established between the Centre and the planned International Laboratory for Research in Animal Disease (ILRAD). Until a decision has been made concerning the siting and host country relationships of the two institutions it is not possible to recommend precisely how this liaison should best be organized. The present proposals are intentionally flexible on this matter but provide for the amalgamation of the two institutions into a single Centre should this be considered appropriate.

14. It is recommended that the Centre should be established under the authority of a Director-General who would be responsible to a Governing Board of not more than fifteen members. The Director-General would have under his immediate supervision a Director of Research and a Director of Documentation and Training. If ILRAD becomes a component of the Centre its Director would likewise be responsible to the Director-General.

15. By the end of the first phase of development the number of senior professional staff (excluding ILRAD) is expected to total 28.

16. The proposed capital costs are \$4.75 m.* for Phase One and \$1.30 m. for Phase Two. Recurrent costs (with an annual 8% growth factor) are budgeted as rising from \$1.36 m. per annum to \$2.62 m. per annum and totalling \$5.89 m. in Phase One, and from \$3.23 m. per annum to \$6.81 m. and totalling \$25.19 m. in Phase Two. For the initial 8-year period capital costs total \$6.05 m. and recurrent costs \$31.07 m. These estimates do not include the costs which have been separately proposed for ILRAD, nor do they include enabling costs of \$0.50 m.

17. It is recommended that an Executing Agency be nominated to undertake further planning and to supervise the initial stages of establishing the Centre.

* Note: All cost estimates in this report are expressed in US\$.

CHAPTER TWO

BACKGROUND

Origin of Mission

The concept of an international centre for animal production and rangeland improvement in Africa has been under discussion for several years. Following a series of conferences and commissioned working papers in 1968 - 1970, the Rockefeller Foundation undertook to sponsor a detailed study and to present its findings to the Technical Advisory Committee (TAC) of the Consultative Group on International Agricultural Research.

Two proposals were submitted at the end of 1971, one for an International Laboratory for Research on Animal Diseases (ILRAD) and one for a more comprehensive centre, concerned with broader issues of animal production. The former proposal was endorsed by the TAC and approved by the Consultative Group but the case for a broader animal production centre was regarded as incomplete.

Accordingly, an African Livestock Sub-Committee was established by the Consultative Group. This Sub-Committee invited the Rockefeller Foundation to carry forward the ILRAD proposals and arranged for the IBRD, supported by UNDP, to service the present Task Force in a review of the broader issues of animal production research. The IBRD commissioned the services of Professor D.E. Tribe (University of Melbourne) as team leader. Team members - Dr. Barry Nestel (IBRC), Mr. D.J. Pratt (ODA) and Dr. M. Thome (EMVT) - were provided by their respective agencies.

The four members of the Task Force first assembled at the IBRD in Washington on 30 March 1972 and were given the following terms of reference, which had been agreed by the African Livestock Sub-Committee:

Terms of Reference

1. The purpose of the mission is to provide the Consultative Group on International Agricultural Research and its Technical Advisory Committee with a report and recommendations containing all the necessary information

on which to base decisions for accelerating research on animal production and health in tropical Africa, with special reference to ruminant livestock.

2. In undertaking its survey and writing its report it is understood that the mission will interpret research in animal production and health in its widest sense, including breeding, feeding, management, and related health aspects of husbandry; the improvement of range and pastures; the social and economic factors affecting the livestock industry with particular emphasis on marketing. The survey would pay due regard to the recommendations of TAC and decisions by the Consultative Group in relation to the control of trypanosomiasis and East Coast fever.

Objectives

3. The mission will have the following objectives:

- (a) To identify and define the different ecological zones in which it is likely and desirable that livestock development should be intensified.
- (b) To identify the basic animal production problems in these ecological zones - political, social, economic, and technical.
- (c) To analyze the research work that has already been conducted in these ecological regions, with particular reference to its influence on present livestock husbandry practices. Special note should be taken of reasons for the failure of development projects to make use of research results, with the aim of identifying the main obstacles to progress and the best means of overcoming them.
- (d) To assess the adequacy of the existing research institutions staffs and facilities, both to meet their stated objectives and to undertake any new activities which might be essential for more rapid progress in livestock development, including training of research workers or managers for the industry.

- (e) As a result to determine the main gaps and weaknesses in current activities in animal production and health research (as well as any avoidable duplication of such activities) including any related training and 'outreach' activities.
- (f) To prepare a report and recommendations embodying the conclusions of the mission.

Report and Recommendations

4. The mission will prepare a report which will:

- (a) Define the main objectives of and priorities for the future research on animal production and health in Africa, giving due regard to the bearing of ongoing work on those priorities.
- (b) Having regard to (d) above, indicate the approach recommended to achieve these objectives, and other alternatives which were considered in reaching their recommendations. In so doing the mission should take into account the need to avoid duplication as well as to strengthen, where necessary, existing regional co-operative or national research programs.
- (c) Specify the type, function and location of any new facilities should these be considered essential.
- (d) Make any additional proposals which they consider necessary to create an effective over-all network for research, training and outreach on animal production and health in Africa, linking international, multi-lateral, regional and national efforts and providing a suitable mechanism for coordination of research, training and information.
- (e) Indicate a provisional cost structure and five-year operating budget for the proposals under (c) and (d) above - differentiating capital from recurrent costs,

and the core program (of any major new centre which may be recommended) from outreach activities, 'relay' station support program costs, etc.

- (f) Suggest a mechanism for over-all control, direction, and management of any new efforts proposed, covering both production and health aspects of the work.
- (g) Make recommendations for initial logistic support to any new activities proposed, and means of obtaining any necessary expert guidance and advice in respect to program formulation as well as administration, and construction if necessary.

Mode of Operation

Logistic support for the Task Force was provided by the IBRD and support at the country level for field trips in Africa was coordinated by UNDP Resident Representatives working in close harmony with FAO and IBRD Field Mission Chiefs in countries where these organizations had representatives.

The Chairman of the African Livestock Sub-Committee of the Consultative Group wrote a letter accompanied by an explanatory paper to appropriate Ministers in the countries to be visited. This letter explained that the Task Force was seeking views "concerning the desirability of an international animal research activity in tropical Africa" and invited suggestions "as to how such an activity might be planned in order to give the greatest possible support to livestock development programs." It also invited Ministers to submit written comments in addition to discussing these matters with the Task Force. The Task Force leader also wrote to the Directors of Animal Health and Production Services and Directors of Livestock Research Institutes in the countries to be visited.

UNDP Head Office notified all of its Resident Representatives in Africa about the Task Force and requested their cooperation in supporting its activities in the field.

After its initial briefing in Washington, the Task Force visited those donor agencies in North America and Europe which have a particular interest in the livestock industries of Africa. Visits to West, Central and East Africa followed, interspersed with further consultations in Europe. After preparing a draft report, a final round of visits was made in North America, Europe and Ethiopia, before returning to Washington to finalise this Report. The details of the itinerary are recorded in Annex I.

The Mission's liaison with the Consultative Group was maintained through its contact with the Chairman of the African Livestock Sub-Committee. In addition the leader of the Task Force submitted a short interim report at International Centres Week in August 1972 and he also attended the third meeting of the African Livestock Sub-Committee which took place at the same time and which reviewed the progress being made by the Task Force.

CHAPTER THREE

LIVESTOCK IN TROPICAL AFRICA

By world standards current levels of animal production in tropical Africa are extremely low. There is an enormous wastage in potential meat and milk production due particularly to excessive preweaning mortality, inadequate nutrition, and poor standards of management and health. The times taken to reach market, the percentage offtakes and the average marketed weights of the livestock all compare unfavourably with those in most other parts of the world.

To some extent this situation is due to climatic limitations, but there is also ample evidence to show that the application of known technology would considerably increase present African livestock production. Indeed new development schemes across the continent are now demonstrating that marked progress can be achieved once the essential conditions for change have been effectively met.

Ecology

Tropical Africa covers about 23 million square kilometres. This area contains about 130 million cattle, 100 million sheep, 80 million goats, 12 million equines and 9 million camels, and encompasses an enormous range of ecological conditions, ranging from desert to temperate highlands and tropical rain forest.

In West and Central Africa the main ecological zones correspond to belts of increasing rainfall, from the Sahara to the rain forests of the coastal belt and the Congo Basin. These have been designated by the French workers as the Saharien, Sahelien, Soudanien and Guinéen zones. In East Africa, where there is more upland country, rainfall and ecology are determined more by elevation, and a series of six eco-climatic zones are recognized, from Afro-alpine mountain peaks, to land of forest potential, moist and dry woodland or 'savanna', dry thorn bushland and semi-desert. South of the Congo Basin there is a broad belt of Isoberlinia - Brachystegia woodland and savanna (miombo) that extends from Zambia through to southern

Tanzania. These several zones - their characteristics and problems - are described in more detail in the Rockefeller Foundation Report of 1971.

The present distribution of livestock varies markedly between ecological zones and is determined particularly by the distribution of forage and water and the risk of disease. For example tsetse fly, the vector of trypanosomiasis, effectively precludes most breeds of cattle from some 12 million square kilometres of territory, predominantly land of high forage potential. Apart from the relatively trypano-tolerant breeds of West Africa, most livestock are forced to remain in the drier zones or at the higher altitudes.

In general there is little integration between livestock and crop production. The respective ways of life of the stock-owners and cultivators are largely unrelated, with the result that the livestock are almost solely dependent for their nutrition upon natural herbage. Thus the marked seasonality of growth of the vegetation is generally reflected in the erratic growth of the livestock.

In many areas the concentration of livestock has led to overgrazing. Indeed, the continued deterioration of the drier rangelands constitutes one of the most urgent problems facing the region. One solution would be to open for livestock production those areas which have been unoccupied because of tsetse fly or other constraints. On the other hand the maintenance of these constraints may represent one of the most effective ways of preserving natural resources until such a time as they may be used rationally.

It has often happened that expensive tsetse eradication schemes or water development programmes, or even standard types of animal disease control measures, have resulted in serious ecological deterioration, often involving the uncontrolled intrusion of people and their livestock into new areas in such a fashion as to perpetuate and extend the undesirable conditions which the development of the new land was intended to relieve. Lands which are still unoccupied need to be protected from unplanned exploitation until viable settlement schemes can be implemented.

Many rangelands support substantial wildlife populations and offer prospects for the economic production of additional animal protein by game-cropping. Having examined this potential, the Task Force has concluded that, while it undoubtedly exists in limited and specific areas, the management of game animals and the harvesting and marketing of game meat present sufficient difficulties that it is unlikely that this form of production can play more than a token part in satisfying the meat demands of Africa in the foreseeable future. The Task Force also came to a guarded conclusion regarding the large scale export prospects for game meat.

Economics

The economies of almost all African countries are heavily dependent on agriculture. Agriculture is both a means of livelihood and a source of income for the greater part of the population, about 80% of whom are engaged in agriculture as their primary occupation. For the region as a whole the agricultural sector contributes about 40% of the Gross Domestic Product (GDP).

Within the agricultural sector the livestock sub-sector plays an important role and utilizes a substantial labour supply. However, since much of its output is used for subsistence consumption and for draft power, and therefore does not enter the market economy, the importance of livestock in the economy is usually underestimated. Bearing this in mind, it appears that the total value of livestock production in tropical Africa, including the value of products which are not marketed, exceeds US\$ 1 billion per annum. This figure represents about one-seventh of the value of total agricultural production or 5 to 6% of the GDP of the area. The total livestock inventory exceeds US\$ 8 billion, and appears to have grown over the last decade at a little over 2% per annum.

Apart from questions of income, employment and resource utilization, there is a major need to develop the livestock industries of Africa on the grounds of the projected future demand for animal products. This has important implications from the standpoints of both nutrition and trade. The current consumption of animal protein in the region averages only about 10 grams per head per day. Per capita consumption levels of meat, milk and

eggs are of the order of 12, 16 and 1 kg per annum respectively. The income-elasticities of these commodities are high in most countries and FAO has projected (using a constant price assumption) a growth rate in demand of the order of 5 to 6% per annum.

Since the limited evidence available indicates that price elasticities are also high, this demand projection foretells a severe shortage of meat or a substantial rise in prices, or both, unless the traditional growth rate in production increases two-fold or more. Assuming a growth rate in animal production of 3 to 4% per annum, FAO's Indicative World Plan (IWP) projected for 26 tropical African countries that by 1985 there would be a deficit of over 1 million tons of meat and 700,000 tons of milk.

During the first decade of the IWP period the growth rate in livestock production has fallen behind the stated targets. In African countries where economic growth has been most impressive (e.g. Ivory Coast and Nigeria) the shortfall in supply of meat has led to an increase in imports and, except where prices are controlled, to a sharp rise in meat prices. In the future, unless the current trend in production improves dramatically, the result must be still lower animal protein intakes for the low-income groups and a severe drain on foreign exchange for purchasing livestock imports to meet the demands of the higher income groups.

This situation will, in the long run, also effect the regional pattern of trade, since currently the trade in livestock products is an important source of income for a number of African countries. If domestic demand outstrips local production, export earnings will decline. Since the opportunities for expanding exports of other tropical commodities are generally bleak, a decline in livestock exports could have serious balance-of-payment implications for traditional meat exporters. The seriousness of this situation is underlined by the fact that a global shortage of meat is already developing, so that a change in the regional trading balance for meat will not only represent a loss of potential earnings but will also mean that each ton of meat imported will require more foreign exchange.

Alternatively, the expected global shortage of meat represents an exciting opportunity for any African country that can meet the hygiene standards of the European market, since market prices for meat in Africa are currently well below European levels.

Social Factors

In view of the demand that exists for animal products, it is perhaps paradoxical that few of the past efforts to increase livestock production have achieved sustained success. Despite some notable exceptions - including individual and group ranches, and the introduction of high-grade dairy cattle in areas of higher potential - little has yet been achieved in increasing productivity on a sustained basis for the tens of millions of animals managed in the traditional manner on open rangeland. In the main, what has been offered to pastoralists has failed to persuade them to change their systems.

The major reason for this failure is that efforts to bring about change have usually stressed technical factors and have largely ignored socio-economic considerations. Too little recognition has been given to the fact that in most situations the stockman is still a herdsman or a shepherd rather than a rancher or a farmer. To a considerable extent he lives outside or on the fringes of a monetary economy and usually he attaches greater importance to the number of his stock than to their productive efficiency. For the most part, livestock provide the link between life and death, and it is not surprising that a cultural tradition related to livestock keeping has developed in a pattern closely associated with the constraints imposed by the environment.

The key features of the pastoral tradition are as follows:

1. Livestock are individually owned but grazing and water resources are rarely individually owned, so that their use is opportunistic, favouring short rather than long term objectives.

2. Livestock have a multiple value and can represent variable combinations of wealth, prestige, prerequisites of adulthood, marriage or parenthood, and subsistence, as well as being convertible into a money value.
3. Different classes of stock represent different value systems. Camels and cattle are major items of property whereas sheep and goats are used more as everyday currency.
4. The multiple value of livestock and the mobile conditions of pastoral life tend to isolate the pastoralist from consumer goods and reduce the marketing incentive. However, improvement in communications and in supplies of consumer goods are leading to changes in market orientation.
5. The structure of subsistence herds may vary radically from that desired for commercial production. Old animals are often retained beyond their productive life while a need for draft oxen may lead to a preponderance of males. Likewise, if milk is the preferred diet there will be a preponderance of females in the herd.

The life-style of the pastoralists is difficult to change because it already represents a highly integrated and by and large successful adaptation by the society to long-standing social and environmental requirements. Two requirements of change are often security of tenure and the organization of the people into a form of social institution adapted to their circumstance.

However, increasingly evidence is accumulating to show that improvements in animal husbandry leading to increased yields can be achieved even in subsistence societies. The reasons why this is now possible are many, but stem from the basic fact that developments such as disease control, improved communications, better market prices, and the greater concern of governments for the welfare of rural peoples, have together provided greater security in the life of the livestock owner, so that he now has less fear that the thin thread upon which his survival depends will be broken.

Technology

There are three main ways in which the supply of meat from domestic livestock can be increased in Africa:

- (a) by increasing the offtake percentage;
- (b) by increasing the weight of animals slaughtered; and
- (c) by increasing the number of animals in the national herds and flocks.

Offtake can be improved most directly by reducing death rates (e.g. through disease control and better water supplies) and by developing new marketing facilities. It can also be sought by increasing the percentages of sheep and goats relative to cattle, since the former can yield an offtake of 30 percent annually, whereas from cattle it is difficult to exceed an average of 15 percent. However, the quickest way of increasing overall beef production undoubtedly lies in the provision of facilities which will enable a greater number of cattle to be removed from the arid zones and reared or fattened under more suitable conditions.

To divert large numbers of cattle from premature slaughter, or death caused by seasonal or periodic drought, requires improved marketing facilities and areas where fattening and finishing can take place. Suitable unoccupied land is available in many African countries, but it requires development, especially in terms of tsetse control, pasture improvement and the provision of water supplies. National development corporations and ranching cooperatives can play their part in this if they have available efficient managerial staff and the necessary capital. The smallholder in the high potential areas could also contribute, especially where he has excess maize, groundnut or other crop residues which could be used to fatten a few steers.

In addition to opportunities for increasing offtake and carcass weight, almost all countries in tropical Africa have scope for increasing the numbers of livestock in their national herds, particularly in the zones of high potential. The more immediate need is often for a redistribution of livestock (especially to relieve serious overgrazing in the drier localities)

but, where appropriate, increases in herd size can be achieved through better management, improved reproductive efficiency and reduced calf mortality (which runs from 10 to above 50%).

Each of these potential means of increasing meat production requires basic improvements in existing methods of livestock husbandry. In particular, it will be necessary to revise the methods of cattle feeding in order to relate management practices to the differing nutritional requirements of pregnant, lactating, growing and fattening stock, and to use different species of grazing animal to exploit to the full specific differences in grazing behaviour and feed requirements. Where disease is no longer the limiting factor in production, top priority will have to be given to improving management. With improved management go opportunities for range improvement or grass/legume pastures and for the genetic improvement of the livestock.

Under existing management conditions, arguments about the respective merits of specific cattle breeds are largely irrelevant. The shortage of animals for future development programmes is so serious that use must be made of virtually all that are available. In the present changing situation - where water development, disease control, pasture improvement and better management are all being utilized to improve the nutritional environment - there is little point in seeking specific gene: environment interactions. Even in a stable situation, the quest for the "best" breed or cross is likely to prove long, difficult and, ultimately, unrewarding. Ample evidence already exists to show the advantages of cross-breeding between Bos indicus and B. taurus, and the benefits of genetic selection within the indigenous zebu stock. What is needed is to ensure that breeding programmes are so designed to maximise the exploitation of environmental and managerial potentials.

Rather than concentrating solely on cattle breeding (as occurs in many African countries), it could prove more rewarding to explore also goat and sheep production. Small stock often have specific advantages over cattle, as well as some disadvantages, and too little is yet known of their relative merits and of the problems involved in their more efficient production.

Undoubtedly a substantial potential also exists in poultry. Since our terms of reference refer specifically to ruminant livestock we have not examined the poultry situation, but clearly a fully integrated approach to animal production cannot ignore the poultry sector, particularly in view of the interactions between poultry and ruminant stock in areas such as feedstuff requirements and meat consumption practices.

Research and Training

There are already many national and regional research centres operating in tropical Africa. It is essential that any new research investment should be considered in relation to (a) the state of present knowledge and the scope of present research programmes and (b) the range of existing research facilities.

State of Present Knowledge

The accumulated results of many years of study in a wide range of disciplines already provides a substantial foundation of technical knowledge on which to base development programmes and further scientific progress.

In particular, outstanding advances have been made in animal disease control, which has received top priority in most investigational programmes. Several major livestock diseases (e.g. rinderpest, contagious bovine pleuropneumonia, anthrax, pasteurellosis, and the clostridial infections) are already substantially under control or, at least, are capable of control given the appropriate infrastructure and organization.

The achievements of veterinary scientists have been supported by the work of geneticists, nutritionists, agronomists and rangeland ecologists. In country after country such work has clearly shown that substantial improvements in livestock production are technically possible provided that healthy, well-fed animals of superior genetic quality are grazed according to the established tenets of good pasture or rangeland management. More recently, because of the improved availability of feed grains and agricultural by-products, attention has been paid to the technical problems of supplementary feeding and feed-lot fattening.

However, this is not meant to imply that further biological research is not urgently necessary. Even in those areas in which most progress has been made, important problems remain to be investigated. For example, in veterinary research, trypanosomiasis and streptothricosis are still major problems; while even with diseases for which control measures exist, a considerable advance would follow the development of improved thermo-stable and polyvalent vaccines. Furthermore, as the menace of the major epizootic diseases is successfully overcome, new animal health problems become increasingly important, related for example to helminths, metabolic disturbances and reproductive efficiency. Cysticercosis (beef measles), which may lead to condemnation of carcasses, is assuming increasing economic significance in new ranching enterprises.

It is only now becoming generally recognized that in order to develop African livestock industries further it is necessary to provide inputs of knowledge in economic and social sciences as well as in biological sciences. In most situations, it is problems concerned with land tenure, credit, taxation and marketing, or with human attitudes, education and behaviour that limit the application of technical knowledge, and thus the developmental process.

Even basic statistical information is frequently missing or, at least, is notoriously unreliable. Thus the need for investigational work in the social sciences does not refer primarily to the more sophisticated techniques of econometrics and the behavioural sciences. Rather, the immediate need is for:

- surveys to determine existing resources;
- investigations to identify the most important and sensitive social and economic constraints to livestock development; and
- analyses of ongoing development programmes in order to identify the reasons for success or failure.

The bibliographical note presented as Annex II draws attention to the large amount of published material concerning livestock production in

tropical Africa. There is also a substantial bulk of unpublished results in the files of research stations in many countries. Unfortunately the existence of available results is often not fully appreciated by research and planning staffs. The situation is accentuated by a communications problem between countries of Anglophone and Francophone Africa, and the frequency of staff changes which makes it difficult to maintain either continuity in research policy or the verbal transmission of accumulated research wisdom. The latter is an important characteristic of the older, larger and more stable research laboratories.

There is also a shortage of good library and documentation facilities in Africa. The scientist working in a national research station is likely to find it extremely difficult to determine the present state of knowledge in his particular field. In such circumstances the duplication and repetition of work is inevitable.

The work of the Inter-African Bureau for Animal Resources (IBAR) is making a useful contribution to the communications problem, although this task has to compete with its many other responsibilities for which limited funds and staff are available.

Existing Research Facilities

The present limits to African research efforts are set by the availability of trained staff and recurrent research budgets rather than by a shortage of research facilities. In particular, the several laboratories for veterinary research in West, Central and East Africa are well-designed and equipped and are capable of handling an expanded research programme with only minor extensions. Several of these laboratories include an adequate variety of modern facilities for any normal range of studies in pathology, virology, bacteriology and parasitology.

We have not prepared a precise inventory of research stations, but the general picture is clear. The East African Livestock Survey of 1965 noted 25 stations in three countries, representing a total research area of more than 18,000 ha. Although a few of these stations have since been closed others have started, including the 24,000 ha Range Research Station at Kiboko

in Kenya. The situation in West Africa is broadly similar. For example, in six Francophone countries visited, by the Task Force, twelve research stations were seen and the existence of at least ten more was noted.

However, there is a relative lack of stations in the arid zones where there is a need for more research activity because of their extent, sensitivity to misuse and importance as breeding areas for livestock.

Training

It is noticeable that the livestock research services of Africa are largely dependent upon expatriate staff. Although the number of African research scientists is steadily increasing, the demand for professionally trained men in other sectors (for which expatriates are often unsuitable) is so high that many years will elapse before the research services will be manned predominantly by local staff.

In the meantime, every encouragement and opportunity needs to be given to African research staffs in order that they should improve further their scientific and technological expertise, and that they should maintain the sympathetic attitude towards development which is so necessary in persons engaged in problem-oriented research.

It is particularly necessary to broaden the disciplinary basis of the training of African scientists engaged in livestock development and research. At present not only is there a shortage of trained manpower but there is a preponderance of people who are trained primarily in animal health. The number of animal production scientists and rangeland specialists is low and in the fields of livestock economics, marketing and production sociology there are hardly any African personnel. There is an urgent need to train more specialists of every type and to attract many more people into fields other than animal health.

The primary objective in the University training of veterinary and livestock specialists lies in the production of the maximum number of first degree graduates. Although most governments and universities recognise the need for more postgraduate courses they appreciate that for many years it will be necessary to use overseas institutions for this type of training.

All of the universities that we visited have plans for developing postgraduate courses but only three of them yet provide such training, to any significant degree, in the livestock field. Moreover the structure of African universities does not lend itself readily to postgraduate training being established on a multidisciplinary basis, although there is a severe shortage of broadly based personnel who are needed as decision makers in both the policy and research fields.

Development Objectives

The first aim of development in the African livestock industries must be to satisfy the rapidly increasing demands of the home market for meat and milk and thus to improve the economic prosperity, the nutritional status and employment opportunities of the African people, not least the livestock-owners themselves. At the same time livestock production must be expanded in a manner that is ecologically sound and that can be sustained indefinitely without deterioration in the natural environment. An associated aim should be the continued expansion of markets for animal products.

Since the livestock industries of the region are characterised by an extreme diversity of ecology, human populations and stages of economic development, their development on a regional basis represents a task of great difficulty and complexity. Clearly no single pattern of development can be applied simultaneously throughout the region as a whole.

The product of this diversity of conditions is a variety of distinct (though sometimes overlapping) livestock production systems, each with its own potentials and limitations for development. For example, the Fulani system, in which there is a symbiotic relationship between pastoralists and cultivators, is distinct from the subsistence pastoral systems of eastern Africa. Within eastern Africa (for example, Somalia) there are separate systems based on sheep and goats, on camels and on a combination of species including cattle. As well as traditional production systems, there now exist a number of development programmes that seek to amend or replace traditional systems, some of them incorporating unique forms of tenure or social organization. Other systems new to Africa include feed-lots.

It is clear that little past and present research has been or is related directly to specific production systems. Admittedly some research transcends individual systems - including a great deal of disease research - but even in these cases the actual implementation of research results, as aids to development, can only be affected by dealing through individual systems. The detailed study of the major production systems of Africa and of the relation between available technology and individual systems, deserves much greater attention than hitherto. Indeed, we judge that the absence of such a study has limited the impact of past research more than any other factor.

In the early stages of development there is limited opportunity for technical progress. The first essential is to create the social and institutional framework within which technical improvement is possible. An environment for change must be created both within the structure of government and at the local level. For example it may be possible at the local level to organize social institutions that are acceptable to traditional societies yet conducive to development. In the longer term, however, change through education is essential. In areas of high potential, the basic education services are usually well-established and in such areas livestock owners are already set on the path of progress, but in the more sparsely populated arid or semi-arid regions social services in general, and educational services in particular, have exerted little influence on the nomadic or semi-nomadic pastoralists.

Despite all difficulties, it is impossible to leave the livestock industry of the drier and more backward areas completely to its own resources. Apart from the social welfare implications of this action, the subsistence pastoral herds account for a substantial proportion of the cattle in Africa, and thus exert a powerful influence on national economies. In particular this livestock population forms an essential reservoir from which can be drawn foundation breeding females for the expansion of beef production in new areas, and for supplying immature and store stock for fattening.

For these reasons the public sector may need to take the initiative in the pastoral areas, in order to promote balanced and rational development.

For example, in areas where major epizootics occur there needs to be strict veterinary supervision of stock movements and marketing, and large-scale disease eradication programmes may be required. Similar public action may be needed to conserve water, soil and vegetation.

Experience throughout Africa has repeatedly demonstrated that attempts to control management and improve livestock productivity have only been rewarded when communal land tenure has been replaced by legal rights of use, held either by individuals, discrete family groups, co-operatives or companies. Not only do established rights of occupancy provide security for the investment of personal effort, private savings and loans from banks and other credit organizations but it also enables governments to identify and act against those who perpetuate mismanagement.

This is not to say that the nomadic way of life is necessarily to be regarded as undesirable. Indeed, in areas of low and unreliable rainfall, a system of husbandry involving a degree of nomadism may be the only acceptable form of production. In such a case, however, the system of land tenure is still of vital importance because without some form of group organization, the rational use of water and vegetation is impossible.

As the development process gathers momentum, disease control, better management and improved breeding and feeding all become increasingly important. A greater flow of credit is required, marketing organizations must be further refined and extension services need to be multiplied. Although the detailed order of these developments varies from district to district according to differences in ecology and social conditions, their general order is surprisingly rigid. For example, there is no point in attempting controlled grazing in an area in which livestock owners insist on communal grazing. Similarly, the introduction of improved exotic cattle to areas in which tick-borne diseases have not been controlled is bound to fail. Individual improvements should not be considered on their isolated merits, but in relation to overall development in a particular area. In other words, to be "an improvement" any particular measure needs to be introduced to the right place at the right time; otherwise it is likely to be a wasteful

expenditure of money and labour. This basic fact again points the need for research and development to be organized in the context of complete production systems.

In certain situations, such as where land is sparsely populated and where capital and management are available, advanced technologies and improved systems of cattle ranching can be introduced relatively quickly, circumventing many of the social and economic problems which have been emphasised in this chapter. However, although such investment opportunities deserve to be identified and exploited whenever possible, the conditions which they require are only found in relatively few places. Moreover, development schemes of this type do not generally impinge directly on the lives of the millions of traditional livestock owners in tropical Africa or the productivity of their millions of cattle, sheep, goats and camels. Since these traditional owners and their herds make up the major part of tropical Africa's livestock resources any international effort in the field of livestock productivity and research is likely to be of little avail unless it is geared directly to improving the systems in which the bulk of Africa's meat and milk is produced.

CHAPTER FOUR

THE ROLE OF INTERNATIONAL RESEARCH

Summary of the Need

The facts and arguments presented in the previous chapter have led the Task Force to the following conclusions.

1. It is technically possible to bring about a substantial improvement in the level and efficiency of livestock production in tropical Africa, and for economic, social and ecological reasons such a improvement is urgently needed.
2. Social and economic factors are the major constraints limiting the rate of livestock improvement in most localities. Nevertheless significant changes are occurring and there are grounds for believing that many governments and peoples are prepared to accelerate the speed of change even in the sensitive areas of social, fiscal and land reform.
3. Although there exists a great deal of information concerning animal health and production in tropical Africa, much of this knowledge is not readily available to research workers and planners nor is it in a form appropriate for development purposes.
4. Many animal research stations already exist in tropical Africa but shortages of scientific staff and finance impose severe limitations on the scope and effectiveness of current research programmes.
5. There is a serious lack of research and survey work in economics and social anthropology as they relate to animal production and further biological research on various aspects of animal health and production is urgently required. Of even greater importance, few efforts are being made to integrate the biological, economic and social aspects of research programmes. In consequence differences in attitudes and objectives occur between various authorities and departments responsible for formulating livestock research and development plans and the agencies which implement them.

6. Hopeful progress is taking place in livestock production, including the development of several major schemes of ranching, cattle fattening and small-holder development. The progress of such schemes needs to be systematically monitored so that the planning of future programmes can be further improved.

Recommended Aims of International Research

These conclusions have led the Task Force to believe that a contribution by the Consultative Group to the livestock research needs of Africa would be thoroughly justified provided that its specific focus is integrative research centred upon the multidisciplinary study of existing animal production systems and the formulation of new or amended systems. This would necessarily involve social anthropologists and economists as well as biologists and would seek to:

- quantify vital herd statistics, husbandry methods and animal performance in relation to the environment and to the material and cultural needs of particular societies;
- establish relationships between the biological, environmental, social and economic components of production systems and identify points in the systems which are sensitive or resistant to change;
- identify those specific topics in which a lack of knowledge limits development and in which research is therefore a priority need.

Such a contribution would not only fill a major gap in the present organization of research and development but would serve to maximise past research and support ongoing programmes. It will complement, but in no way duplicate, the work of the various research stations and universities which already exist in Africa. Moreover this orientation and approach will provide the appropriate context for the other associated activities which we believe to be most desirable.

Thus the Task Force recommends that a new International Centre for the Development of Animal Production in Tropical Africa should engage in

the following set of limited and carefully defined activities, which are listed in the chronological order in which they would be developed:

- to retrieve, assemble and make available in both English and French all information relevant to animal production in tropical Africa;
- to engage a multidisciplinary team for a research study of existing animal production systems with a view to designing and testing new or amended systems and defining future research priorities;
- to support and cooperate with existing national and regional research stations in developing a fully coordinated programme of multidisciplinary research encompassing a full range of ecological, economic and social conditions and relating appropriately to the urgent needs of livestock development;
- to develop the capacity to undertake specific research programmes which for one reason or another are appropriate to an international centre and which are not being undertaken elsewhere;
- to provide, or assist in providing, suitable training programmes for personnel engaged in livestock research, extension, planning and production;
- to make available statistical support, information or advice to national, regional or international authorities who may seek it, in the various fields relating to animal production in which the Centre is actively engaged.

In all of these activities, the Centre should seek every opportunity of cooperation with existing institutions in Africa. The ultimate success and effectiveness of the Centre will depend upon its influence through the activities of national and regional institutions rather than directly through its own activities. In order to be influential the Centre must achieve an appropriate status and identity of its own, but it should not put itself into competition with existing institutions. Its essential role should be complementary, cooperative and catalytic.

The recommended programme of work is set out in the following section. This programme is intended to provide only sufficient detail to support an informed discussion on this proposal and on its attendant financial and organizational implications. Necessarily considerable discretion and freedom of action has been left to the future Governing Board, Director-General and staff of the Centre.

Recommended Programme of Work

Documentation and Information

The Task Force regards the development of an efficient documentation and information service as being vitally important, particularly in the early life of the Centre since, to a considerable extent, it will establish the framework on which the other activities of the Centre will be based. The Task Force has itself assembled a considerable bibliography and collection of documents (see Annex II) but we recognise that, with the limited time and facilities available to us, it has not been possible to do more than identify the need.

A specialist staff is needed to collect, collate, analyse and disseminate all the relevant information that is available, including an inventory of ongoing research programmes. It is envisaged that this staff will provide an information service for the livestock research and planning authorities in Africa, and will publish bibliographies and reviews on particularly important topics. It is essential that its activities should be bilingual, thus bridging the gap between the Anglophone and Francophone literature.

It has already been noted that much of the information collected at African research stations has never been published. Largely because of staff changes and a lack of continuity in research policy, a substantial collection of important and reliable information remains in the files of these stations. An essential part of the proposed documentation service would therefore be the retrieval, storage and classification of these results so that they are readily available in a form designed to meet specific development or research purposes.

A further important activity will be the collection of statistics relating to animal production in Africa. At present the methodologies of collecting statistics as well as the reliability and availability of the data are open to serious criticism. It is envisaged that the activities of the International Centre would aim to improve the methods and extent of recording livestock statistics, and that the Centre would cooperate with national authorities to increase the reliability and usefulness of statistical information.

The proposed staffing pattern for the Centre provides for a range of specialists to assist the documentation, information and retrieval activities and also includes specialists in communications so that the information disseminated by the Centre will be designed both to have the maximum impact and to help and encourage national extension authorities in their own communication activities.

For all of these activities it will be necessary for the Centre to house a complete library, documentation and reference bureau.

In the course of these activities it is important that the Centre should cooperate fully with the existing national and international organizations which are operating in similar fields. For example, a close liaison should be maintained with the Inter-African Bureau of Animal Resources (which is a branch of the Scientific, Technical and Research Commission of the Organization of African Unity) and with the various abstracting and review bureaux in Europe (e.g. IEMVT and the Commonwealth Agricultural Bureaux). We are aware that FAO has already taken the initiative in proposing the establishment of both an International Information System for the Agricultural Sciences and Technology (known as AGRIS) and a Computerized Agricultural Research Information System (CARIS). These projects are designed to achieve their aims through an international pooling of efforts

and resources under the aegis of FAO. We believe that the Centre will benefit from these developments and that it will also be able to make a valuable contribution to them.

Animal Production Systems

It has already been emphasised that technical answers are available to many of the specific problems facing livestock development of Africa. The major constraint lies rather in the difficulty of introducing change into existing socio-economic systems, combined with inexperience in adapting technologies to suit local situations.

The first task of the interdisciplinary team would be to gain a basic appreciation of the major livestock production systems of Africa, by the study of all available literature, a review of ongoing research programmes, and widespread travel and survey. From this base the team will then be expected to devise its own programme of studies.

Having established broad frameworks for systems studies, it is anticipated that a more analytical phase will soon follow, which will both identify areas of specific ignorance which deserve priority attention in future surveys and research, and suggest new or amended systems of animal production. This research effort will concentrate on techniques of rangeland management, livestock production, disease control and marketing which could be incorporated in future development schemes. Such techniques and systems will almost certainly require validation and further investigation, either at the Centre itself or within a cooperative programme at national stations, so that a constant interplay can be expected between research and development planning.

Emphasis initially should be given to studies of those societies which at present own most of the livestock, but with the objective of expanding, as soon as possible, to embrace a wider range of agricultural and commercial systems. When the

appropriate methods and teamwork have been established regional units might possibly follow.

It will also be important to examine the response of traditional systems to development processes. Indeed, the monitoring of ongoing development programmes needs to receive a high priority, since these programmes represent unique experiments which can never be reproduced in the confines of a research station. If not given early attention, a great volume of information crucial to future livestock development will be lost. At first these studies are likely to be mainly in eastern Africa, where existing development programmes already affect a wide range of pastoral societies, though they would be selected also for their wider relevance to Africa as a whole.

The envisaged programme will combine the latest techniques of mathematical simulation and modelling with constant field investigations, and will therefore require close liaison with national workers in related fields. There will need to be regular meetings to discuss ongoing programmes, principles and objectives, and to allow for joint planning.

No single institution could develop the complete range of specific livestock systems which is needed to cover all the diverse conditions of tropical Africa, but the basic studies of the proposed Centre will concentrate on the development of production systems in selected but real situations. These will then serve as comparative methodological models to stimulate and promote consideration and attack on this problem by national authorities.

It needs to be emphasised that the activities which are separately described as information services, training and production systems research are, in fact, closely related and best considered as a single, well-integrated continuum. Thus the research team will be dependent on the work of the information staff and will participate in survey and data retrieval activities. Similarly the range of training activities will be influenced by, and largely dependent on,

the participation and progress of the information section and the research team.

Cooperative Research Programmes

Most African authorities supported the principle of an international centre, though it was made clear to us that such a centre would only be welcomed if it:

- supported and complemented national programmes of research and avoided undesirable overlap or duplication;
- attracted additional financial support from donor agencies and did not syphon off support which at present goes to national stations or which national stations might reasonably seek in future;
- did not disrupt local staffing patterns and recruitment by offering superior salaries and conditions to the limited number of scientists on which national research programmes now depend;
- recognised that the diversity of ecological, economic and social conditions across tropical Africa is such that most applied research concerned with livestock production needs to be done in particular localities and cannot be concentrated at a single research station.

The Task Force agrees with these views and recommends that the Governors and staff of the Centre keep them prominently in view as the Centre and its programmes develop. This will then ensure that the Centre will function in such a manner as to strengthen and support national programmes of research.

Such an approach is already a prominent characteristic of the older international centres. However, whereas centres such as IRRI and CIMMYT have been able to use the distribution of improved genetic materials as a convenient basis on which to build their cooperative programmes, no comparable distribution is practicable in the case of a livestock centre. Instead the

cooperative programme will have to be built on training and support to national research projects. It is to be hoped that the Centre will also contribute through influencing attitudes to research and development planning but it is likely that, in the first instance, support to national research projects will be the contribution that is most easily appreciated and, therefore, most warmly welcomed.

It is therefore recommended that where the Centre has identified a project in a particular location as being of priority importance, it should have the capability of supporting it with suitable finance and staff. Normally this will be done by seconding small teams of Centre staff to national or regional institutions to undertake specific projects for specified periods of time. These projects will be those that are regarded as "essential" for the Centre's own overall programme but are best carried out on existing stations elsewhere. In such cases the cooperating stations would be required to afford an appropriate degree of autonomy to the out-posted Centre staff.

The full nature of the cooperative research programmes cannot be predicted at this stage. A large part will arise directly from the analysis of production systems while other parts will emerge as a sequel to research meetings between national and international representatives. However, certain fields of activity can be anticipated.

Research in the Sahelian and Soudanian zones is likely to range from the control of desert encroachment in the drier extremities to maximising the advantages of cultivable land in the more humid areas. Since this is an important livestock breeding zone a critical area of research will be the improvement of reproductive performance and the reduction of calfhood mortality in the indigenous zebu cattle. Dry season nutrition and parasite control are other obvious topics that will need attention, as well as comparative studies on calf rearing, to determine the feasibility of removing cattle from the region at a young age for fattening in higher potential areas.

Work designed to favour stratification in the livestock industry will need to be pursued also in the more humid agricultural and forest lands. Important subjects for examination here will be the use of agricultural surpluses or by-products for intensive livestock feeding and the introduction and use of improved grasses and legumes. There is also a need for studies into the basis of trypanosomiasis tolerance in the N'Dama and related breeds of cattle, as well as for work on cross-breeding to produce animals capable of optimising the use of improved pastures in the humid tropics.

The eastern rangelands share some problems with the rangelands of West Africa but require less emphasis on calfhood mortality and more on maximising offtake through institutional incentives, improved marketing and better husbandry. More emphasis is also needed on grazing systems for the better utilization of the natural vegetation, and on comparative studies on wildlife and wildlife-livestock relationships.

Throughout all of the drier rangelands of tropical Africa there is a need to establish criteria and appropriate methods for assessing range condition and trend. Although these are essential management tools, appropriate methodologies for African conditions have yet to be developed. Attention also needs to be given to the effects of development in the cattle industries on the status, productivity and marketing of other herbivores, both domestic and wild.

Training

Closely allied to the documentation and research functions will be the training and conference activities.

The Centre would be expected to organize seminars and technical short courses on selected specialist topics, and frequently to act as host to such meetings (although some meetings may be held at other venues, e.g. universities, in Africa). In this class of meeting the international staff will not necessarily assume an instructor role. By providing opportunities for small groups of specialists from various parts of Africa (and, in appropriate cases, other parts of the world) to exchange views, experiences and results, the Centre would serve to facilitate and catalyse the free

exchange of information and the development of scientific thought among animal research workers in the tropics. These activities will also help to establish the Centre's position and partnership role in relation to national scientific staff and institutions.

There is also a need for specialist training in particular research techniques. For example, postgraduate courses are needed in statistical methods concerned with experimental design and analysis, in computer programming, and in the analysis of animal breeding records. We anticipate that courses would be offered for social scientists as well as biologists and that instructors would be engaged temporarily to help permanent staff members in running these courses. Provision may also be needed for certain types of specialised training to be undertaken elsewhere than at the Centre.

It is envisaged that the Centre would also provide opportunities for young research workers to experience periods of "in-service" training, during which the trainee would work as part of an established, multi-disciplinary team actively engaged in livestock research. Such experience would widen the trainee's technical skills, and would help to inculcate appropriate attitudes of enthusiasm, healthy scepticism, and an applied orientation. Thus we have recommended a staffing pattern which includes graduate trainees at the Centre who would participate in the work of the proposed research team.

Apart from technical training, we are persuaded that there is an urgent need for programmes organized specially for those responsible for the planning of the livestock industry. When the work of the Centre has been sufficiently advanced, senior officials from government departments of planning, agriculture and natural resources, together with heads of statutory marketing boards and similar institutions should be invited to participate in small, high-level seminars on policy and planning. Such seminars would consist primarily of an exchange of information and experience among participants, though they would rely also on the results of the Centre's research. Apart from establishing frameworks for future livestock research and development in Africa, such seminars would also serve to identify the position and role of the International Centre, thus strengthening its overall effectiveness.

Other Research Activities

In addition to the programmes summarised above, it is anticipated that the Centre will need to conduct special research projects on its own land at its own expense and under its own supervision. In general, this will apply when a project:

- is long-term and demands continuity of staff and policy;
- involves sophisticated equipment that is especially expensive and delicate;
- requires scientific supervision and control of an unusually high order; or
- concerns an important investigation of a basic type, the results of which are likely to have widespread application.

Because it is not possible to foresee exactly the research needs that may be identified, or the extent to which existing facilities will meet the situation, it is not possible to anticipate what field facilities may eventually be needed by the Centre. Therefore, there is a case for delaying a decision on the siting and development of the field station facilities until such a time as the precise nature of the need for them has been established.

On the other hand, it is also possible to argue that at least a basic minimum of field facilities should be provided from the start in order to support the programme of training activities and ensure that the Centre staff are not cut off from the day-to-day disappointments, successes and frustrations of animal research. Further, the Centre may be unable to establish for itself a position of influence and leadership in African live-stock production until it has demonstrated its practical skills in animal production as well as its scientific expertise.

In this situation, the Task Force found itself unable to make a unanimous recommendation on the timing of the development of field station facilities. Although budgetary provision has been made for a station to

be established in Phase One some of us believe that this should have been delayed until specific needs have been identified.

Consultant Activities

As the various activities of the International Centre develop and its general status and standing become established in the broad field of animal production, we anticipate that its assistance will be sought by various national and international agencies responsible for planning and operating schemes of livestock development.

The experience of the international staff will enable them to make valuable contributions when invited to do so, and we believe that such an association with the development process will serve to keep pressing problems of an applied nature before the staff. The consultant role can therefore be expected to grow in importance, to the benefit of both the development process and the programme of studies at the Centre itself. However, care will be needed not to involve the Centre staff too deeply in tasks such as the identification, preparation or appraisal of projects for donor agencies. Nor should the Centre at any time encroach on the decision-making processes of governments.

Suggested Phasing of Activities

It is proposed that the International Centre should be established as quickly as possible, but that its development should be planned in two phases.

After the appointment of the senior administrative staff, Phase One should concentrate on the establishment of the documentation and information service, and the phased recruitment of the systems research team. All staff will begin by gathering background information and defining priorities but, as the work proceeds, their separate programmes will steadily emerge. Areas will be identified in which original research or survey work is needed, and in which seminars or workshops are most appropriate. As the work of the research group becomes more analytical it will be possible to identify research priorities for cooperative programmes or for special projects which may need to be investigated at the Centre itself.

Thus the first year of work will be devoted almost exclusively to documentation and information activities, including an inventory of ongoing research. By the end of the second year the programme of seminars and technical conferences should be established and the research on production systems will have begun. Although it will not be before the end of the third year that it will be possible to identify, establish and operate a comprehensive programme of project research in cooperation with national stations, it is anticipated that a start will be made with the cooperative programme in Phase One and budgetary provision has been made for this.

We propose that Phase Two should start at the beginning of the fourth year of work, and its planning should be based upon a detailed review of the progress made during Phase One. Such a review, after two and a half years, would aim particularly to define the need and extent of the cooperative research programme and would include the possibility of creating regional sub-centres.

At that time the case for broadening the programme of studies (in either a geographical or disciplinary sense) will have to be considered. However, the aims of the Centre need to be kept in sharp focus as too great an expansion of research involvement could seriously dilute the overall effectiveness of the Centre as well as greatly increase its costs. Inevitably the programmes will be multidisciplinary and complex but it is to be hoped that the Governing body and Director-General will curb excessive ambitions and over-complex administrative structures.

Therefore, although this Report outlines ways in which Phase Two might develop and the order of costs which might be involved, we recommend that these and any other proposals, be reviewed carefully by a Special Review Committee after the Centre has been operating for about two and a half years, i.e. towards the end of Phase One.

At the same time, it is appreciated that no hard and fast line can be drawn between these two phases, and therefore we recommend a limited budgetary provision in Phase One for such developments as may be necessary, at the discretion of the Governing Body and the Director-General, to lay a firm but flexible foundation for Phase Two.

Intercontinental Cooperation

In accordance with the Terms of Reference, this Report concentrates upon the research needs of tropical Africa and the impact which an international research effort might have upon those needs. However, it is emphasised that the envisaged Centre should also maintain close cooperative relations with various research organizations and universities in other parts of the world. The stress we have placed upon the multidisciplinary study of production systems as the core of the research programme makes such cooperation particularly important.

It is more usual for an animal production research centre to concentrate upon the investigation of biological problems by teams of biochemists, physiologists, nutritionists, microbiologists, geneticists, etc. Our departure from this model is not because we doubt its validity but rather because we believe that the greater need in Africa is for research studies on production systems which would seek to integrate and adapt existing and new knowledge to particular socio-economic and ecological situations.

However, the two approaches must be regarded as essentially complementary. Thus the proposed International Centre will rely a great deal on the basic biological studies being conducted by other organizations concerned with animal production in the tropics, such as the French Institut d'Elevage et de Medecine Veterinaire des Pays Tropicaux (IEMVT), the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) and the Instituto Interamericano de Ciencias Agricolas (IICA). Also a great deal of basic work being carried out in universities and research institutes in Australasia, Europe, India and North America may have an important bearing upon animal production in Africa.

Therefore, we envisage that the staff of the Centre will maintain a continuing liaison with individuals and organizations in various parts of the world. Although the Centre will not wish to duplicate such work as that being done by CSIRO on tropical pasture and forage production, or by IEMVT on particular aspects of tropical animal diseases, it will seek to use the

results of these research programmes and to adapt them appropriately to the needs of particular production systems in tropical Africa.

Close contact should also be maintained with the animal research programme of CIAT and the studies of farming systems at IITA and ICRISAT. Similarly the work of the proposed animal research laboratory in Indonesia, which is to be operated jointly by the Indonesian Department of Agriculture and CSIRO, is likely to yield results of interest to workers in Africa.

At the same time, although the work of the Centre is designed specifically in relation to the needs of tropical Africa, we anticipate that it will have a value in a wider context. In particular we would expect that the approaches and methodologies developed by the Centre would be of interest and help to individuals and organizations in many parts of the world. Also certain of the Centre's training courses are likely to attract, and benefit from, participants from continents other than Africa.

CHAPTER FIVE

ORGANIZATION AND ESTIMATED COSTS OF AN INTERNATIONAL CENTRE

General Considerations

The Task Force considered several possible approaches to international livestock research in Africa. The option of recommending that no action at all should be taken at this time by the Consultative Group was discarded because the urgent need for developing Africa's animal production was recognized and the opportunity for an appropriate research programme to accelerate this development was identified. Similarly the possibility that a centre should be established with its headquarters in Europe was considered and discarded, mainly because of the overwhelming need to give the centre an African orientation and identity.

Three possible approaches were considered in greater detail, namely:

- increased support to existing national and regional efforts;
- the development of two or more centres of international research, either as new stations or by strengthening existing stations;
- the development of one headquarters centre, linked by an "outreach" system to the existing research effort.

The provision of increased support for existing work without any central coordinating mechanism seems unlikely to yield rapid advance. Each developing country is deeply concerned with solving its own problems and few can give much attention to the needs of their neighbours. Not only would there be differences in priorities between nations, but there could well be conflict within countries on what constitutes appropriate research for international funding. Furthermore, the dispersal of effort over a wide area would seriously

limit the depth in which any specific problem could be studied. Therefore although there is a clear need for additional funding for national stations, the Task Force does not regard this in itself as the most profitable method of utilizing new international support.

The establishment of a number of separate research centres might be more effective but would be very expensive. At least three major ecological regions would need to be covered, and the dispersion of staff over several centres could well result in slower progress at all of them. The estimates given later for the minimum staffing and budgeting of one international centre serve to indicate the costs which might be involved in establishing two or more centres. Moreover, a basic aim of the international effort should be to establish a closer integration between zones in the stratified development of the livestock industries. The development of separate centres in different ecological, political or lingual zones might detract from this cooperation and integration.

The Task Force concluded that the most effective form of international support would be to locate a research headquarters in an area where the animal industry is of major importance and to develop from that centre a comprehensive "outreach" research programme incorporating a network of national and regional stations. Other international centres (e.g. IRRI and CIMMYT) have demonstrated that an effective pattern can be built in this way.

Location of the Centre

The ideal requirements for the location of the headquarters of the Centre are as follows:

- (i) Ready accessibility to an international airport which has good connections to East, Central and West Africa.
- (ii) Proximity to a population centre which enjoys a tolerable climate and provides reasonable amenities to staff members and their families (shopping, education, health services and entertainment).

- (iii) Desire on the part of the host country to have the Centre and willingness to provide tax and import concessions and other privileges appropriate to an international centre.
- (iv) Availability locally of trained personnel sufficient to provide the required supporting scientific, technical, administrative, clerical and domestic staff.
- (v) A social and educational environment that would readily accommodate French and English speaking people and which could provide bilingual support staff.
- (vi) Proximity to a range of ecological conditions, diverse animal production systems and ongoing schemes of live-stock development.
- (vii) Availability of field research facilities within a reasonable distance of the Centre headquarters.
- (viii) Proximity to a university which has active programmes of study in agricultural economics, sociology, agriculture and veterinary science.

The following specific locations were identified as possibilities: Abidjan (Ivory Coast), Addis Ababa (Ethiopia), Dakar (Senegal), Kampala (Uganda), Nairobi (Kenya), Yaounde (Cameroon), and Zaria (Nigeria).

Abidjan is an active city with a large expatriate population. It houses the headquarters of the African Development Bank and the regional office of the World Bank in West Africa. The climate is humid and can be oppressive during the hot season. The city probably has the best air connections of any city in West Africa, although the service to East Africa is still somewhat limited. Medical, shopping and schooling facilities are excellent although good schooling to university entrance level is only available in the French language. There is a local University, of which l'Ecole Nationale Supérieure Agronomique (ENSA) is a part.

There is considerable interest in livestock development on the part of the Government, particularly in view of the increasing drain of foreign exchange due to imports of livestock products. However, the cattle population is one of the smallest in the region (0.3m) and is located mainly in the north of the country. The main livestock stations are in the north (Korogo) and in the centre (Bouake). The range of ecological conditions is limited.

Addis Ababa has a large expatriate population and is the headquarters of the ECA and the OAU. It has a cool and healthy climate although the high altitude (2500 m) does not suit everyone. Air connections are already good and appear to be improving further. It possesses the best schooling facilities of any African city for expatriate children in that schooling is available in English, French, German, and Italian. Medical and shopping facilities are reasonable and improving but are still not as good as some other cities. A University exists in Addis but the Agricultural Faculty is at Alemaya, 500 km or one hour's flight away. A Veterinary Faculty is soon to be established but whether it is to be at Alemaya or Debre Zeit has not yet been decided.

The country has by far the largest cattle population in Africa (26 million). It also has a wide range of ecological conditions, although close to Addis Ababa it is highland country, and field stations under typical Sahelian and humid tropical conditions are not available in Ethiopia. Several government stations and ranches exist, most with limited staff and facilities at present. There are several development schemes just starting.

The Government strongly supported the concept of the Centre and expressed its desire to have the headquarters located in Addis Ababa. They indicated their readiness to provide the necessary requisites and conditions for such a centre. An Addis Ababa location appeared to be acceptable to most donors and African countries, particularly those who prefer a location that is not strongly identified either with Anglophone or Francophone attitudes.

Dakar has a dry and pleasant climate and good living conditions for expatriates, though schooling facilities only exist in the French language. The city is served by good air connections to Europe and West Africa but has limited flights to East Africa and is isolated geographically because of its location on the extreme west of the Continent. The supply of bilingual staff is very limited.

Although only the Soudanian zone is immediately accessible from Dakar, conditions tend towards Sahelian in the north of Senegal and towards Guinean in the South. The main animal production research station is at Dahra, 260 km from Dakar in the Sahelo-Soudanian zone, and there is a large and well-equipped veterinary research laboratory managed by IEMVT in Dakar. The University of Dakar has just started a Veterinary Faculty but lacks a Faculty of Agriculture. There is a large commercial feed-lot outside Dakar and a pastoral development programme in the north but the range of livestock development schemes is still limited.

The Task Force gained the impression that the Government had a limited interest in hosting the Centre although the matter was not discussed in precise terms.

Kampala provides reasonable living conditions for expatriates though schooling is limited at the high school level, especially for non-English speakers. There are University faculties of Agriculture and Veterinary Science at Makerere University. Air connections are moderately good, especially via Nairobi.

Within a few hours driving of Kampala there are a number of research stations and a range of different ecological zones. There is an active development programme.

The Government had some reservations about the likelihood of success for the proposed Centre and did not indicate that they would be enthusiastic to act as host.

Nairobi is probably the most attractive city in Africa in terms of living conditions for expatriates. Air connections are good both to Europe and the rest of Africa, although there is still room for improvement in services to the West. Medical and shopping facilities are excellent but schooling in French and German is limited. There is a local University with a flourishing Veterinary Faculty and a more recent Faculty of Agriculture.

The country has an important cattle industry and a good network of livestock research stations. Although Nairobi itself is situated at 1,650 m. elevation, drier and lower conditions lie within a reasonable distance (as also does land of higher potential) and there are good prospects of finding a suitable location for a field station. There are also in Kenya opportunities for collaboration with a wide range of ongoing development programmes. The headquarters of IBAR are in Nairobi and it seems likely that ILRAD will also be located near at hand.

Indeed, it is just this strength of the Nairobi location that has led some people to express the opinion that the new Centre would be better located in an area where its impact might be more readily identifiable. This sentiment appears to be sympathetically understood in Kenya which expressed considerable interest in the Centre without pressing for Nairobi to be the headquarters location.

Yaounde is an attractive city with a limited but nevertheless adequate range of social, educational and medical facilities. Air connections are moderately good, particularly when connections via Douala are included.

The main advantages of Yaounde are that it is the capital of the only bilingual country in Africa and that the Government would warmly welcome the Centre. The University has an Agricultural School and, if the Centre was located in Yaounde, field station facilities would probably be available adjacent to the University Farm, about 10 km from the city.

A wide variety of ecological conditions exist in the country - from Sahelian zone in the north to Guinean rain forest in the south, with

substantial areas of highland plateaux - but the livestock population is more restricted, numbering barely 2 million cattle and 4 million sheep and goats.

Zaria is the site of the Institute for Agricultural Research and Ahmadu Bello University with strong Faculties of Agriculture and Veterinary Medicine. It is an attractive area climatically but from the point of view of the Centre its distance from an international airport is a serious disadvantage. Also several people have suggested that since the only international centre already in Africa (IITA) is in Nigeria her neighbours and some donor agencies might not readily accept that a second centre should also have its headquarters in that country.

Zaria offers access to a good range of ecological conditions but it is a relatively small city and the supply of local supporting staff, particularly those that are bilingual, would be limited. Schooling facilities also are limited. Although the Task Force does not regard Zaria as the best place for the Centre it could play an important part in the projected cooperative research programme.

It is clear that none of these possible locations can be judged to be ideal from all points of view. However, the Task Force is agreed that the choice can be limited to Addis Ababa, Dakar, Nairobi and Yaounde, and that first consideration should be given to Addis Ababa. This recommendation is based on Ethiopia's large cattle population, potential for development and general international acceptability (though one of us is uncertain that the 'acceptability' of Addis Ababa outweighs the advantages of Nairobi).

From discussions held in Addis Ababa it seems likely that a satisfactory location for the headquarters could be made available in the city with ready access to the airport. We envisage that such a site, of about 10 ha, would accommodate the administrative, systems research, documentation, information and training activities of the Centre. The choice of field station facilities may be more difficult. Although suitable highland sites could be made available close to Addis Ababa or at Debre Zeit (the location of the Imperial Veterinary Institute,

the School for Animal Health Assistants and the University Research Farm), work carried out at these locations would be limited in its application. However, several alternative (or additional) sites were mentioned by Ethiopian authorities and some of these, in the Awash and Rift Valleys were visited by members of the Task Force. A more detailed study of these sites, including soil and water surveys, would be necessary before a final decision is made. However, for the reasons presented in Chapter 4, the Task Force does not think that it is essential to identify specifically the location of an Ethiopian field station before establishing the Centre headquarters.

Should the Consultative Group wish to establish the Centre headquarters in West or Central Africa, the Task Force recommends that consideration should be given to Yaounde.

Administration and Governance

It is envisaged that the Centre would be administered by a Director-General who would be nominated by the Consultative Group and approved by a Governing Board.

The Director-General would be responsible for the internal operation and management of the Centre and for ensuring that the programme and objectives for the Centre are properly developed and carried out. He would be a member of, and would serve as Executive Secretary to, the Board. The Board would be responsible for the development and/or approval of the policies under which the Centre operates and would approve the appointment of all senior scientific staff on the recommendation of the Director-General. The Board would also review and approve the budget estimates for the Centre.

Governing Board

It is envisaged that an Interim Board of five to seven members would be designated by the Consultative Group to serve a period of one year or until a permanent Governing Board is fully constituted. If the permanent Governing Board is patterned on existing international

centres, it might consist of up to fifteen members selected on the following lines:

- (i) Three representatives from the host country, to be chosen from such persons as the Minister or Secretary of Agriculture, Animal Industry or Rural Development (as appropriate), the Minister or Secretary of Planning, the Director(s) of the relevant technical department(s), or the Vice Chancellor or Dean of Agriculture of the National University.
- (ii) Three representatives of the Consultative Group on International Agricultural Research.
- (iii) Six or more representatives from the scientific, agricultural and educational leadership of the countries to be served by the Centre including at least three from West Africa, with at least two of these members being from the Francophone countries.
- (iv) Not more than two non-African scientists of international repute who are familiar with the problems of livestock research and development in Africa.
- (v) The Director-General of the Centre (Executive Secretary).

The Consultative Group would be responsible, in consultation with the Interim Board, for constituting the above Board, and for designating its chairman and the members appointed under headings (ii)-(iv). Two of the eight members appointed under headings (iii) and (iv) would be appointed for one year and three each for two and three years; thereafter the Board itself would designate successors to non-ex-officio members whose term shall expire, or who leave the Board for other reasons. Members appointed under headings (i) and (ii) would be ex-officio and would hold office at the pleasure of the responsible Minister of the host country and the Consultative Group respectively.

Programme Committee

The Task Force further recommends that a committee of scientists should be constituted, four to six in number, consisting of outstanding scientists competent to assess the quality of the work in the biological, economic, sociological and communications programmes of the Centre. The committee would conduct an annual review of the programmes of the Centre, assessing their quality, accuracy, strengths and weaknesses, and would advise the Board as to how these programmes should be modified to meet changing needs.

The Committee should contain two or three scientific members of the Board and one of these Board members should be Chairman of the Committee and should report its activities to the full Board. The Programme Committee should meet at least once annually, in advance of the annual meeting of the Board.

Relations with ILRAD

Since the aims and activities of ILRAD and the present Centre are closely complementary, it is desirable that their programmes and financing should be coordinated. This could be arranged in various ways, from placing ILRAD completely within the organizational structure of the new Centre, under the same Director-General and Governing Board, to having two autonomous institutions between which there are frequent, though largely informal, contacts at all levels.

From the scientific point of view there is likely to be little, if any, advantage to either institution in uniting a laboratory staff "composed of specialists who will focus on fundamental aspects of host resistance or tolerance and the processes and mechanisms of immunity to protozoan infections" (ILRAD Proposals) to a second team of field oriented biologists, economists and social anthropologists who will be analysing systems of animal production. On the other hand, common

direction would ensure that, in the longer term, any major changes in programme emphasis would be fully coordinated.

Since there is no irrefutable argument in either direction, we believe the final decision is best deferred until questions of siting and host country relationships have been resolved.

Host Country Relations

Prior to establishment, the Centre must be provided with appropriate legal status by the host country, adequate to enable it to function effectively as an international centre. The Task Force believes that specific legislation should be worked out with great care prior to any firm commitment, so that the authority and status of the Centre and its programmes are assured.

In particular, arrangements and assurances are needed for expeditious movement of:

- staff members;
- visiting scientists, administrators and trainees;
- semen, ova, animals and plant material; and
- research data and results.

Agreement must be assured that there will be no restrictions on the appointment and posting of staff or on the entry and participation of scientists, trainees, and other visitors. This must be established irrespective of whether or not the host country has active diplomatic relations with the country of origin of the individual concerned, subject only to normal checks and clearances required for security purposes.

Additional assurances will be necessary for the establishment of a quarantine unit, in association with the Centre, to assure prompt examination of incoming and outgoing livestock shipments and thus avoid any unnecessary delay of animal movement. In principle, no restrictions are anticipated

other than the examination necessary to avoid the import or export of diseases and pests which might pose a threat to the livestock industries of the host country or to others to which animals, semen or ova may be sent.

Provisions will also be needed covering tax exemptions for non-national staff members and personal and scientific equipment and effects. These should follow the provisions established for existing international centres, with any additional provisions which the experience of other centres has shown would be required for smooth and effective operation of the programme.

In the case of Ethiopia, the Minister of Agriculture has already indicated that no difficulty need be anticipated in reaching the required agreements with the Imperial Ethiopian Government.

Staffing

Employment policies and conditions for senior scientific staff should be on an international basis without discrimination as to nationality or origin or any considerations other than scientific and professional merit and performance.

It would be hard to over-emphasise the importance and the difficulty of recruiting first class scientists who can work together as an effective multidisciplinary team and who combine their specialist expertise with a broad and practical "development orientation". We therefore urge that recruitment procedures should be cast as widely as possible and that there should be no hurry to complete the staff establishment according to any particular time-table. Rather we would prefer to see the central research team grow steadily from a carefully hand-picked nucleus of five widely experienced scientists (animal scientist, biometrician, ecologist, economist and social anthropologist). This nucleus team should include experience of the systems approach and of African livestock production.

Since the Centre will operate in both English and French-speaking African countries it is desirable that all senior staff be able to work fluently in these two languages. To this end staff who are not bilingual

in English and French should undertake a course in the appropriate language, at the Centre's expense, prior to assuming duty with the Centre.

Technical, clerical, administrative and operational support personnel should be drawn largely from the host country and should be employed under terms and conditions approved by the Governing Board. Conditions of employment for such personnel should approximate accepted norms of the host country, but with such modifications as may be necessary to assure availability of qualified and competent staff.

Phase One

Although the Director-General will require latitude to develop organizational patterns and methods of programme administration, a projected staff complement for the first phase of the Centre's operations is set out below, as a guide for estimating personnel and related requirements. This list excludes the requirements of ILRAD.

Administration

Director-General

Director of Research

Director of Documentation and Training

Treasurer/Controller

Administrative Officer

Central Research Team (Animal Production Systems)

Animal Scientists 3 (Animal Breeder
Animal Nutritionist
Epidemiologist)

Ecologists - 2 (Range Ecologist
Wildlife Ecologist)

Economists - 2 (Marketing Economist
Production Economist)

Social Anthropologists - 2

Biometrician - 1

Forage Crops Agronomist - 1

Hydrologist/Climatologist - 1

Documentation and Training Section .

Chief Librarian

Communications Specialist (Audio-visual aids and publications)

Data Retrieval Specialist

Head of Translation Unit

Information Officer/Editor

Liaison and Training Specialists (2)

The proposed senior staff will need the regular support of assistant scientists, research assistants and lay staff. These will include data analysts, abstractors, translators and field staff. In addition, provision should be made for visiting scientists.

Further, the scope and variety of research activities and the productive output of the Centre's staff could be increased significantly through the planned use of trainees. Thus it would be expected that the Centre would accept as many trainees as the staff and facilities can accommodate. Under appropriate supervision, these trainees would play an important role in the research activities of the Centre, and in the process gain valuable experience of the interdisciplinary systems approach.

Table 1 presents by years the numbers and categories of staff and trainees that might be engaged in the Centre's programmes during Phase One. This Table shows the manner in which the central research team is expected to grow progressively over the years. While the main cooperative programme will not be developed until Phase Two, provision is included for one outposted research unit to be established in the last year of Phase One.

Phase Two

In the third year of operations the Director-General would be expected to prepare his proposals for the next five years for examination by a Special Review Committee appointed by the Consultative Group. These proposals would cover such possibilities as:

- expanding the central research team;
- recruiting permanent or fixed-term research staff for the cooperative programme with national stations;
- increasing the number of field stations run by the Centre.

Clearly the definition of the staff requirements after the third year will depend on the findings of the central research team and the opportunities offered for developing the cooperative programme. Broadly speaking the Task Force envisages that the central research team might expand by about four posts in this quinquennium and that cooperative research programmes with national stations might be expanded at the rate of one per year, each involving 3-4 outposted scientists. These figures are offered at this stage to indicate the type of budget that might be involved, as presented below.

It is also possible that in Phase Two a case will be established for a new international sub-station to serve the drier rangelands. At present there is only one station in the whole of the Sahelian zone (Toukounous, Niger) and none in the equivalent zone of eastern Africa. There is relatively little information on which to base the rational utilization of this land and, in particular, there is a need for long-term management studies. If the site were in West Africa it would have the added advantage of providing a base for a regional survey and systems team studying the Fulani and related systems. There should be little difficulty in locating a suitable site in Mali or Niger at the appropriate time.

It is not anticipated that the Centre will establish any other regional units, except perhaps in Central Africa, in the event of national

development plans for the intensive development of miombo belt for livestock. It would seem unlikely at this stage that any new station will be established in the rain forest belt, which is already served by IITA. The inclusion at IITA of studies on the role of livestock in the agricultural systems of the forest belt could well develop as a natural progression of IITA's existing work on farming systems.

Capital Development

It is envisaged that the headquarters of the proposed Centre will include the following buildings or capital works:

- Administrative headquarters
- Dining and recreation facilities
- Housing for senior staff
- Library and documentation bureau
- Research building
- Residence for trainees and visitors
- Site works
- Training and conference building
- Workshop and store

The following cost estimates are based on the assumption that the Centre will be in Addis Ababa on a 10 ha site which we have been encouraged to believe would be provided by the Imperial Ethiopian Government.

Discussions with appropriate authorities in Addis Ababa led us to conclude that:

- it would be more economic to build staff houses than to rent them;
- there is no need in Addis Ababa to install air-conditioning or central heating;

- a number of large national and international architectural and building companies operating in Addis Ababa have had recent experience of designing and erecting buildings of the type, size and quality required for the Centre.

On the basis of estimates derived from recent building costs in Addis Ababa the following calculations have been made. It will be appreciated that these are approximations only and that a detailed review of all capital cost estimates will be needed immediately a decision in principle has been taken concerning the present recommendations. However in making these calculations we have purposely taken the highest of the range of figures given to us. Therefore we regard them as "realistic guesses" and would be surprised if they would need to be increased at the next planning stage.

<u>Building</u>	<u>Cost in US\$</u>
Administrative headquarters	210,000
Dining and recreation facilities	190,000
Housing for senior staff (24)	775,000
Library and documentation bureau	750,000
Research building	250,000
Residence for trainees and visitors	430,000
Site works (including water purification and storage, sewerage disposal, roads and landscaping)	165,000
Training and conference building	200,000
Workshop and store	80,000
	<u>\$3,050,000</u>
To which must be added: Equipment	1,000,000
Contingency	<u>500,000</u>
TOTAL	<u>\$4,550,000</u>

In addition to the capital needs of the headquarters, provision also needs to be made for the capital development of a possible headquarters field station (\$500,000) and for such facilities as may be needed in each of the cooperative research projects (\$200,000 per project).

Operating Costs

We have provisionally estimated annual operating costs by deriving these as a function of professional staff numbers and assuming that the total operating costs of each member of the professional staff will average \$80,000 per annum in 1973, rising by 8% per annum to \$148,000 by 1981. These figures,

which include training, documentation, research and all other costs, are derived from data collected from other international agricultural centres. They will need to be reviewed carefully when the Governing Board has approved the Director-General's detailed Programme of Work.

A Notional 8-Year Budget

Tables 1 and 2 show the projections of senior staff and total staff during Phase One of the Centre's development. Table 3 lists the estimates of capital and operating costs and shows how annual expenditures are spread over each year of Phase One and Phase Two. It will be seen that the total annual expenditure is expected to increase from \$3.11 million in 1974 to \$6.81 million in 1981, and that the total expenditure during the first 8 years will total \$37.12 million.

TABLE 1

Phasing of Senior Staff in Phase One

<u>Time Elapsed in Years After Consultative Group has Agreed to Finance Centre</u>	<u>Numbers of Senior Staff</u>				
	0.5	1.5	2.5	3.5	4.5
<u>Administration</u>					
Director General	1	1	1	1	1
Director of Research	-	1	1	1	1
Director of Documenta- tion and Training	-	1	1	1	1
Treasurer/Controller	-	1	1	1	1
Administrative Officer	1	1	1	1	1
<u>Central Research Team (Animal Production Systems)</u>					
Animal Scientists (3)	-	-	1	2	3
Ecologists (2)	-	-	1	2	2
Economists (2)	-	-	1	2	2
Biometrician	-	-	1	1	1
Social Anthropologists (2)	-	-	1	2	2
Forage Crops Agronomist	-	-	-	1	1
Hydrologist/Climatologist	-	-	-	-	1
<u>Communications & Training Section</u>					
Chief Librarian	-	1	1	1	1
Liaison & Training Specialists (2)	-	-	2	2	2
Information Officer/Editor	-	-	1	1	1
Data Retrieval Specialist	-	1	1	1	1
Head of Translation Unit	-	1	1	1	1
Communications Specialist	-	-	1	1	1
<u>Cooperative Research Team</u>					
Disciplines to be determined		-	-	-	4
	2	8	17	22	28

TABLE 2

Total Staff at End of Phase One (4.5 years after
Consultative Group has agreed to finance Centre)

<u>Programme Area</u>	<u>Inter- national staff</u>	<u>Research Assistants (a)</u>	<u>Visiting Scientists (b)</u>	<u>Training (c)</u>	<u>Clerical</u>
Administration	5				10
Central Re- search Team	12	40	6	36	20
Documentation and Training	7	25		21	10
Cooperative Research Team (d)	4	12	2	12	4
	28	77	8	69	44

- (a) Young B.S. and M.S. personnel: 3 to 4 per senior scientist
- (b) Dependent on need and availability (numbers purely illustrative)
- (c) Junior research staff: 3 to 4 per senior scientist
- (d) Assuming that one cooperative project is established in Phase One

TABLE 3

Estimated Capital and Operating Costs for Years 1 to 8

It is anticipated that enabling funds will be provided separately to cover the first 12 to 18 months subsequently the approximate annual costs will be:

			<u>Years</u>								
			<u>Phase One</u>			<u>Phase Two</u>					
			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>Total</u>
<u>Capital Budget (\$m)</u>											
Headquarters	1.75	1.75	0.55	0.5							4.55
Headquarters Field Station			0.5								0.50
Co-operative Research Programme			0.2	0.2	0.2	0.2	0.2				1.00
Total Capital Costs \$m	1.75	1.75	1.25	0.7	0.2	0.2	0.2				6.05 m
<u>Operating Budget (\$m)</u>											
No. of Scientists at HQ	17	22	24	25	26	27	28			28	
No. of Scientists in the Cooperative Research Programme	-	-	4	7	11	14	18			18	
Total Operating Costs \$m	1.36	1.90	2.62	3.23	4.03	4.82	6.30	6.81			31.07
Total Annual Requirements \$m (Capital and Operating)	3.11	3.65	3.87	3.93	4.23	5.02	6.50	6.81			37.12

Name of the Centre

The Task Force has considered a variety of names for the Centre. Obviously the name should be self-explanatory and descriptive of the programme of the Centre. It should preferably be reasonably short and provide an acronym which is easily pronounceable and which carries a favourable connotation. The "Centre for Research on Animal Production" was rejected early in the deliberation.

Tentatively, the Task Force suggests the name "International Centre for the Development of Animal Production in Tropical Africa" (ICDAPTA) although an alternative with distinctive appeal is "Centre for Animal Production and Rangeland Improvement" (CAPRI). Two other possible alternatives are: "African Livestock Centre" (ALC) and "Animal Production, Health and Rangeland Improvement Centre for Africa" (APHRICA).

Future Action

Should the main recommendations of this Report be accepted it will be necessary to establish a mechanism for their implementation.

The Consultative Group will need to designate an Executing Agency to be responsible for the detailed planning and the initial stages of the establishment of the new Centre. The relationships between this Executing Agency, the Consultative Group (or its African Livestock Sub-Committee), the TAC, and their respective Secretariats and the Interim Board of Governors of the new Centre should be specified so that the lines of responsibilities are clearly understood.

In order that the Executing Agency should have adequate financial support for carrying out its task, a special fund should be established on lines similar to those which were established for ICRISAT. If this fund was set at a level of \$500,000 it would provide sufficient flexibility to ensure that finance was available for architectural and legal fees and for the renting of temporary facilities so that the Centre might be operational 12 to 18 months after receiving the approval of the Consultative Group.

The Executing Agency will need to appoint a Project Development Officer who will:

- 1) Reach an agreement with the Imperial Ethiopian Government (IEG) to establish the Centre as an autonomous, legally constituted, international, non-profit making, tax exempt, research, educational and training institution which would function along the lines indicated in this Report.

- 2) Carry out negotiations with the IEG to prepare the charter and the legal framework for the establishment of the independent International Centre. The form of charter and the legal status of the Centre should conform to the pattern set by the existing international centres. The completion of this step should be a prerequisite to any capital commitment.

- 3) Identify candidates for the posts of Director-General and Administrative Officer and present to the Consultative Group (or its nominees) a short-list of candidates from which these appointments could be made. This step should be taken as soon as possible after agreement has been reached with the IEG and the charter and legal framework for the establishment of the Centre are assured.

- 4) Propose to the Consultative Group (or its nominees) suggested personnel to comprise the Interim Board of Governors.

- 5) Provide such administrative support for the Director-General as may be needed.

The first objective of the Director-General should be to develop a Programme of Work and Budget for the Centre. This should detail the nature of the research, training, information, outreach and collaborative programmes. Because of the complexity of this task the Director-General should seek the advice of a multidisciplinary panel of specialists with experience in the fields in which the Centre will be involved. He will also need to travel extensively within Africa and elsewhere in order to identify and liaise with potential cooperating institutions and individuals. This burden would be

lightened if at an early stage of operations he is supported by a high calibre Administrative Officer who is familiar with both the international agricultural network and the African scene.

Only when a detailed programme of work has been developed will it be possible to confirm the staffing needs and the capital and budgetary requirements of the Centre.

Thus a provisional timetable for the establishment of the Centre might follow the following lines, taking as its starting point the time when the Consultative Group gives its approval for the initiation of action.

Stage 1 (3 months)

- a) Establish the enabling fund and appoint the Project Development Officer.
- b) Negotiate an agreement with the IEG to proceed with the establishment of the Centre.
- c) Identify potential candidates for the posts of Director-General and Administrative Officer and possible members of the Interim Board.

Stage 2 (3 months)

- a) Draft the charter and legal framework of the Centre.
- b) Appoint Interim Board of Governors.
- c) Nominate the Director-General (or Interim Director-General) and the Administrative Officer.

Stage 3 (4 months)

- a) Establish the Director-General and Administrative Officer in Addis Ababa.
- b) Develop a programme of work and budget.
- c) Initiate architectural work and obtain preliminary costings.

Stage 4 (6 months)*

- a) Organize temporary office and library accommodation.
- b) Develop detailed plans for physical facilities and obtain tenders for construction.
- c) Commence recruitment of nucleus staff.

Stage 5 (12 to 18 months)

- a) Construct facilities.
- b) Continue recruitment of staff.
- c) Appoint full Board of Governors.

Stage 6

Declare open the International Centre for the Development of
Animal Production in Tropical Africa!

*Note: It is envisaged that the \$0.5 m. enabling fund will cover operations other than Stage 4, item (c).

ANNEX I

ITINERARY

The itinerary, which lasted from March 30 to September 30, was arranged in the following stages:

1. North America and Europe
2. West and Central Africa
3. Europe
4. Eastern Africa
5. Europe and North America
6. Report Drafting
7. Europe, Ethiopia and North America
8. Final Report Drafting

The following pages list the countries, organizations and individuals that were visited in Africa, North America and Europe. Some of these were visited on several separate occasions.

AFRICA

CAMEROON

UNDP/FAO

M. Challons

Deputy Resident Representative

Ministere de l'Elevage

C. Fouapon

Secetaire-General

F. N'zie

Directeur, Service de l'Elevage

N. Eyidi

Directeur-Adjoint, Service de l'Elevage

Ministere du Developpement de l'Industrie et du Commerce

L. Yinda

P. Atemezem

Ministere du Plan et de l'Amenagement du Territoire

N. Ngatchou

Secetaire de la Recherche Scientifique

F. Ngone

Direction de la Recherche Scientifique

F.T. Nguyen

" " " " (UNESCO)

Amadou Bello

Directeur de la Programmation

M. Ecobo

Directeur-Adjoint de la Programmation

J.A. Minland

Chef de la Division des Syntheses

S. Jamet

Division Planification

M. Pem

" "

Universite Federale Cameroun

R. Branckaert

Ecole Federale Superieure d'Agriculture

Organisation Commune Africaine, Malgache et Mauricienne (OCAM)

A. Foalem

Directeur, Departement des Affaires
Economiques, Financieres et des
Transports

Visits included l'Ecole Federale Superieure d'Agriculture et Nkolbisson,
near Yaounde.

CHAD

UNDP/FAO

B. Ly

FAO Country Representative

Ministere de l'Agriculture

B. Lepissier

Service de l'Elevage (FAO)

Laboratoire de l'Elevage de Farcha (IEMVT)

G. Tacher

Directeur-Adjoint

Lake Chad Basin Commission

I. Licht

Economist (USAID)

P. Renard

Conseiller (FAC)

ETHIOPIA

UNDP/FAO

A. Hamersley

FAO Country Representative

M. Bellver-Gallant

JP 15

Ministry of Agriculture

H.E. Abebe Reta

Minister of Agriculture

H.E. Maaza Workinem

Minister of State

Haile S. Belay

Coordinator, Research & Services Department

A. Keshewalul

Head, Animal Production & Health

Asefa Woldegiorgis

Director of Veterinary Services

E. Beyene

Director, Animal Production Division

Hailu Kassa

Director of Livestock Farms

Ephrem Bekele

Range Management Officer

J. Fikre

Director, Imperial Veterinary Institute
(IVI)

G. Chamoiseau	Bateriologist, IVI (IEMVT)
H. Harding	Project Manager, Animal Health School (FAO)
S. Atnafu	Director, Animal Health School
<u>Planning Commission</u>	
H.E. Telaique Gedami	Minister of State
<u>Awash Valley Authority</u>	
A.G. Goudie	Farm Management Consultant (Australian Aid)
G. Lines	" " " " "
<u>Dairy Development Agency</u>	
W. Mekasha	General Manager
R. Sandford	Production Manager (FAO)
<u>Livestock and Meat Board</u>	
Behano Wakwaya	General Manager
<u>Haile Sellasie University</u>	
Mulugetta Wodajo	Academic Vice President
Abraham Besrat	Associate Vice President
Melak Mengesha	Dean of Agriculture (Alemaya)
Amare Getahum	Research Director "
W. Lockhart	Head of Animal Sciences "
R. Carr	Animal Sciences Department
<u>Economic Commission for Africa (ECA)</u>	
R. Gardiner	Executive Secretary
F. Pinder	Special Assistant
E.A. Okwuosa	ECA/FAO Joint Division
E.E. Broadbent	" " " "

M.G. Leroy

ECA/FAO Joint Division

T.W. Sears

" " " "

Organization of African Unity (OAU)

J.D. Buliro

Assistant General Secretary

K.A. Quagraine

Head, Science & Technology Section

I. Macfarlane

Coordinator, JP15

Mission Veterinaire Francaise

J. Desrotour

Chef de Mission

USAID

D.L. De Tray

Senior Veterinary Adviser

L. Holdcroft

Food and Agriculture Officer

J.E. Walker

Manager, Southern Rangelands Project

IBRD

T. Finsaas

Country Representative

Visits included the Institute of Agricultural Research at Holetta, University College of Agriculture at Alemaya, Melka Werer Experimental Station (in the Awash Valley), the School for Animal Health Assistants and the Imperial Veterinary Institute at Debre Zeit, Adami Tulu Breeding Station, Abernosa Ranch and the Chilalo Agricultural Development Unit (CADU) Breeding Station at Goba.

IVORY COAST

UNDP/FAO

K. Englund

Resident Representative

J. Conde

FAO Country Representative

Ministere de l'Agriculture

A. Sawadogo

Ministre

Ministere du Plan

Y. Lemaitre	Conseiller Elevage
M. Montenez	Conseiller Agricole

Ministere de la Production Animale

Dicoh Garba	Ministre
G. Jourdain	Conseiller Technique
M. Rombeau	" " (FAO)
B. Gotta	Directeur, Service de l'Elevage

Ministre de la Recherche Scientifique

. Lohoury	Directeur du Cabinet
. Duplessis	Directeur des Affaires Scientifiques
L. Letenneur	Directeur, Centre de Recherches Zootechniques (CRZ) de Minankro (IEMVT)
J.C. Mathon	CRZ de Minankro (IEMVT)
P. Catala	" "
B. Gombaudo	" "
G. Roberge	" "
M. Richard	" "
D. Secq	" "

Ecole Nationale Supérieure Agronomique

R. Didier de St Amand	Directeur
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ORSTOM Centre d'Adiopodoume

M. Goujon	Directeur-Adjoint
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Société de Développement des Productions Animales (SODEPRA)

P. Lamizana	Directeur
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African Development Bank

. Sakka	Director of Operations
M. Negrin	Livestock Specialist

IBRD

X. de la Renaudiere	Regional Representative
K.H. Ochs	Livestock Specialist
C. Megas	" "

Conseil de l'Entente, Communauté Economique du Betail et de la Viande

. Gurgand	Conseiller Technique (FAC)
-----------	----------------------------

Visits included CRZ de Minankro at Bouake

KENYA

UNDP/FAO

Miss S. Drouilh	Deputy Resident Representative
L. Stenstrom	FAO Country Representative

Ministry of Agriculture

J. Kibe	Permanent Secretary
J.K. Ndoto	Deputy Secretary (Development)
J.S. Mburu	Director General, Technical Services
R.B. Ryanga	Under Secretary (Livestock)
J.J. Njoroge	Chief Research Officer
I.E. Muriithi	Director of Veterinary Services
W.M. Njoroge	Deputy Director of Veterinary Services
R.D.W. Betts	Head of Training Division
D.W. Ware	Head of Economic Planning Division
R.E. Gray	Economic Planning Division
Z. Owiro	Head of Animal Production Division

Ministry of Agriculture (Cont.)

H.W. Were	Senior Research Officer
I. Mann	Project Manager, AHITI (FAO)
L.R.N. Strange	Lecturer (Range Management), AHITI (FAO)
G.G. Kamau	Co-Manager, AHITI
A.M. Manyaya	Education Officer/Registrar, AHITI
M. Creek	Project Manager, Beef Industry Development (FAO)
D.G. Miles	Beef Industry Development Project, Lanet (FAO)
D.M. Redfern	" " " "
E.W. Schleicher	" " " "
H.A. Squire	" " " "
B. Rumich	Project Manager, Sheep & Goat Development (FAO)
G. Smith	Sheep & Goat Development Project, Naivasha (FAO)
C. van Velson	Project Manager, Dairy Research (Danish aid)
. Bonsma	Dairy Research Project, Naivasha
B. Mungi	" " ")
R. Njenga	" " ") (counterparts)
. Mbogoh	" " ")
A.K.A. Siele	Officer i/c National Sahiwal Stud
R. Tonn	Assist. to K. Meyn (German aid)
P. Bartilol	Officer i/c Naivasha Station
. Thorsen	Ag. Chief Veterinary Research Officer
J. le Roux	Chief Zoologist
V.L. Bunderson	Project Manager, Range Management (FAO)

Ministry of Agriculture (Cont.)

M.D. Gwynne	Range Management Project (FAO)
G. Boothby	" " "
E.C. Trump	" " "
C. Allen	" " "
J. Cassady	" " "
A.M. Chege	Ag. Senior Range Officer, Range Management Division
. Wanyama	Range Research Officer (Livestock Improvement)
. Nganga	Farm Manager, Kiboko Range Research Station
. Gitau	District Range Officer, Kajiado
P.J.E. Dorey	Ag. Head of Livestock Marketing Division
M. Mukolve	Provincial Director of Agriculture, RVP

Ministry of Finance

J.W. Yaa	Deputy Secretary
R. Clough	

Agricultural Finance Corporation

S.L. Ward	Ranch Division
G. Murphy	Field Officer, Ranch Division

Kenya Cooperative Creameries

E. Hastings

Kenya Meat Commission

L.A. Culver	Ag. Managing Commissioner
-------------	---------------------------

University of Nairobi

. Mugeru	Dean of Veterinary Science
. Contant	Dean of Agriculture
A.H. Jacobs	Institute of African Studies

East African Community

W.W. Rwetsiba	Minister for Communications & Research
C. Karue	Head, Animal Production Division, EAAFRO
H.P. Ledger	Animal Production Division, EAAFRO
G.L. Corry	Ag. Director, EAVRO
M.P. Cunningham	Project Manager, Tick-borne Diseases (FAO)
G.G. Wagner	Immunochemist, " " "

Organization of African Unity, Inter-African Bureau for Animal Resources (IBAR)

M. Sall	Joint Deputy Director
P.C. Nderito	" " "
K.O. Adeniji	Livestock Officer
. Dahab	Deputy Coordinator, JP 15

IBRD

W. Schaefer-Kehnert

. Adams

Visits included the Range Research Station at Kiboko, the IDA/SIDA Range Livestock Project at Ilkaputiei, the Animal Husbandry Research Station at Naivasha, the UNDP/FAO Beef Development Project at Lanet, the Veterinary Laboratories and the Animal Health & Industry Training Institute (AHITI) at Kabete, the Veterinary Faculty of the University of Nairobi, the East African Agriculture & Forestry Research Organization (EAAFRO) and the East African Veterinary Research Organization (EAVRO) at Muguga.

NIGER

UNDP/FAO

. Atchou

Deputy Resident Representative

A.S. Adande

FAO Country Representative

Ministere de l'Economie Rurale

Noma Kaka

Ministre

H. Baza

Directeur, Service de l'Elevage

P. Bres

Conseiller Zootechnique

R. Ferry

Directeur, Laboratoire de l'Elevage (IEMVT)

J.B. Haumesser

Laboratoire de l'Elevage (IEMVT)

R. Delavenay

" " "

B. Peyre de Fabregues

" " "

J.N. Chambellant

" " "

Van Sivers

" " " (German Aid)

Lawaly Adamou

Directeur, Station Sahelienne
Experimentale, Toukounous

Djariri Badamassi

Zootechnicien, Toukounous

M. Trouette

Directeur, Abattoir

Visits included Kirkissoye Pilot Farm near Niamey, the Laboratoire National de l'Elevage and the Station Sahelienne Experimentale at Toukounous.

NIGERIA

UNDP/FAO

V. Rose

FAO Country Representative

R. Blainey

UNDP Deputy Resident Representative,
Kaduna

Federal Ministry of Agriculture and Natural Resources

Bukar Shaib	Permanent Secretary
I. Mohamed	Director, Department of Livestock, Kaduna
D. Walker	Adviser, " " " "
M. Goni	Director, Department of Veterinary Research, Vom
M.A. Bhatti	Ag. Principal Research Officer, Vom
D.R. Nawathe	" " " " "
A.S. Schael	" " " " "

North-East State, Ministry of Natural Resources

. Azenyake	Commissioner for Animal & Forest Resources
K. Imem	Permanent Secretary
I.M. Khalil	Chief Veterinary Officer
A.O. Hassanein	Provincial Veterinary Officer
M. Bulama	Senior Animal Husbandry Officer
. Zambuk	Range Management Officer
J.B. Cornforth	Principal Livestock Superintendent, Bornu

Livestock and Meat Authority

. Sigle	Veterinarian, Mokwa Ranch (German Aid)
. Chukwujchwu	Veterinary Officer, Mokwa

Ahmadu Bello University/Institute of Agricultural Research

I.S. Audu	Vice Chancellor, ABU
. Dafaalla	Provost, ABU
M. Dagg	Director, IAR
J. Davies	Deputy Director, IAR
E.H. Coles	Dean of Veterinary Medicine

Ahmadu Bello University/Institute of Agricultural Research (Cont.)

S. Dennie	Faculty of Veterinary Medicine
B. Koch	Head, Animal Sciences Department
P. de Leeuw	Officer i/c Shika Research Station
D.W. Norman	Head, Agricultural Economics Department
L.A. Tatum	Officer i/c West African Cereals Project

University of Ibadan

J.K. Loosli	Ag. Head, Animal Sciences Department
-------------	--------------------------------------

International Institute of Tropical Agriculture (IITA)

H.R. Albrecht	Director General
J.L. Nickel	Deputy Director
F. Moomaw	Head of Farming Systems Team
D. Headley	Agricultural Economist

Visits included IITA at Ibadan, Mokwa and Bornu Ranches, Ahmadu Bello University and the Institute of Agricultural Research at Zaria and the Federal Veterinary Laboratories at Vom.

SENEGAL

UNDP/FAO

J. Leger	Resident Representative
R. van den Ammele	Deputy Resident Representative

Ministere du Developpement Rural

T. D'Erneville	Directeur-Adjoint
J. Cissoko	Chef de Division
R. Kerkhove	" "
J. Croquet	" "
J. Orue	Directeur, Laboratoire de l'Elevage (IEMVT)

Ministère du Développement Rural (Cont.)

F. Sagna	Laboratoire de l'Elevage (IEMVT)
M. Rioche	" "
S. Toure	" "
A.K. Diallo	" "
R. Cadot	" "
J. Valenza	" "
R. Boudergues	" "
H. Calvet	" "
Ph. Martin	" "

Ministère du Plan

M. Thiaw	Directeur
El Shazly	Manager, UNDP Project SEN/71/525

Société d'Exploitation des Ressources Animales du Sénégal (SERAS)

M. Ba	Directeur-General
-------	-------------------

Université de Dakar

J. Ferney	Directeur de l'Ecole Veterinaire
-----------	----------------------------------

Organisation pour la Mise en Valeur du Fleuve Sénégal (OMVS)

Ould Amar	Secrétaire-Exécutif
Castiaux	Manager, FAO Regional Agricultural Project

USAID/FAC

H. Lepissier	Livestock Adviser
--------------	-------------------

Visits included Laboratoire National de l'Elevage at Dakar-Hann, and Nutri-Senegal at Bambilor (feedlot owned by General Cheavance-Bertin).

TANZANIA

UNDP/FAO

L. Mattsson	UNDP Resident Representative
-------------	------------------------------

UNDP/FAO (Cont.)

B.B. Jensen

Ag. FAO County Representative

Ministry of Agriculture

N.K. Maeda

Chief Veterinary Officer

Il Molelian

Chief Research Officer (Livestock)

M. Milliken

Chief Planning Adviser (FAO)

Tanzania National Parks/Serengeti Research Institute

A. Mongi

Ag. Director, Tanzania National Parks

H.F. Lamprey

Director, SRI

T. Nchato

Deputy Director, SRI

USAID

O. Hess

Food & Agriculture Officer

UGANDA

UNDP/FAO

W.R. Prattley

Resident Representative

W. Holzhausen

Deputy Resident Representative

R. Stout

FAO Country Representative

Ministry of Animal Resources

B.W. Banage

Minister

H.S.K. Nsubuga

Permanent Secretary/Commissioner

G.K. Binaisa

Deputy Commissioner (Veterinary)

J.H. Kagoda

" " "

G. Sacker

Director, IDA Beef Ranching Project

D. McFarlane

Project Manager, Beef Development (FAO)

W. Querishi

Beef Development Project (FAO)

H. Ekhart

" " "

Ministry of Animal Resources (Cont.)

G. Harrison	Pasture Research Officer, Mbarara
A. Sorensen	Principal, Dairy Training School
J. Mukibi	Principal, Veterinary Training School
S. Rogers	Ag. Director, Animal Health Research Centre
I. Robson	Tick Research Officer, " " "

Makerere University

R.H. Dunlop	Dean of Veterinary Medicine
K. Oland	Dean of Agriculture
H.H. Nicholson	Department of Animal Science & Production
J. Mugerwa	" " " " "

East African Community, East African Trypanosomiasis Research Organization (EATRO)

A.R. Njoga	Ag. Director
B. Allsop	Biochemist
G.J. Losos	Pathologist
F.K. Dar	Protozoologist
T. Ogado	Physician

USAID

V.C. Johnson	Director
--------------	----------

Visits included the Beef Ranching Project at Mbarara, Makerere University, the Animal Health Research Centre, the Veterinary Training School and the Dairy Training School at Entebbe, and EATRO at Tororo.

ZAMBIA

UNDP/FAO

A.C. Gilpin	Resident Representative
T. Rose	FAO Country Representative

Ministry of Rural Development

M.M. Babbar	Under Secretary (Planning)
R.J. Hughes	Economist
J. Vogt	Deputy Director of Agriculture (Research)
H.H. Scott	Director of Veterinary & Tsetse Control Services
I. Gordon	Chief Animal Husbandry Officer
A.H. Beaumont	Head of Land Use Services
N. Mumba	Chief Agricultural Research Officer
R. Craufurd	Legume Breeder, Mt Makulu
D. Cruickshank	Animal Husbandry Officer, Mazabuka
M.A.Q. Awan	Chief Veterinary Research Officer, Mazabuka

National Council for Scientific Research (NCSR), Animal Productivity Research Unit

A. M. Rakha	Principal Professional Officer
-------------	--------------------------------

University of Zambia

A. Quartermain	Senior Lecturer in Animal Sciences
----------------	------------------------------------

Visits included Mount Makulu Research Station and Mazabuka Central Research Station.

NORTH AMERICA

CANADA

Canadian International Development Agency

H. G. Dion	Technical Adviser (Agriculture)
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International Development Research Centre (IDRC)

W. D. Hopper	President
J. H. Hulse	Programme Director, Agriculture Food and Nutrition Sciences

MEXICO

International Maize and Wheat Improvement Center (CIMMYT)

H. Hanson	Director-General
E. W. Sprague	Director (Maize Programme)
R. Ostler	Deputy Director

USA

USAID

S. C. Adams	Assistant Administrator for Africa
J. Bernstein	Assistant Administrator, Bureau for Technical Assistance (BTA)
R. L. Peterson	Deputy Assistant Director, BTA
O. J. Kelley	Director, Office of Agriculture, BTA
N. Konnerup	Animal Health Adviser
F. J. Spencer	Director, Regional Affairs (Francophone Africa)
.Ellis	Director, Regional Affairs (Southern Africa)
J. L. Cooper	Principal Agricultural Adviser, Bureau for Africa

UNDP

M. Gucovsky	Senior Technical Adviser
F. Vandemaele	Senior Technical Adviser

Ford Foundation

F. Hill	Program Adviser for Agriculture
L. Hardin	Program Officer for Agriculture

Rockefeller Foundation

S. Wortman

Vice President

J. A. Pino

Director (Agricultural Sciences)

J. J. McKelvey

Associate Director (Agricultural Sciences)

IBRD

R. J. Demuth

Chairman, Consultative Group/Director
Development Services Department

L.J.C. Evans

Chairman, African Livestock Subcommittee/
Director, Agriculture Projects Department

J. M. Fransen

Agriculture Projects Department

H. Graves

Executive Secretary, Consultative Group

F. Kaps

Assistant to the Executive Secretary
Consultative Group

D. Sutherland

Agriculture Projects Department

R. Khouri

" " "

R. Milford

" " "

M. Walsh

" " "

J. R. Peberdy

" " "

C. Chisholm

Consultant

EUROPE

BELGIUM

Administration Generale de la Cooperation au Developpement

Mme S. Vervalcke

Directeur a la Cooperation Multilaterale

J. Doumont

Principal, Developpement Rural

M. G. Stevens

Universite de Louvain

R. Germain

Directeur, Laboratoire de Phytotechnique
Tropicale

Rijksuniversitair Centrum Antwerpen

F. Evens

Directeur, Laboratorium voor Oekologie

M. Kollaart

Consultant

European Economic Community (EEC)

J. Ferrandi

Fonds Europeen de Developpement (FED)

P. Wirsing

" " "

A. Cerini

" " "

M. Gruner

" " "

DENMARK

International Development Agency (DANIDA)

Mrs. I. Nielsen

K. Winkle

H. Wanscher

Royal Veterinary and Agricultural University of Copenhagen

G. Thomsen

Professor

K. Nielsen

"

FRANCE

Secretariat d'Etat aux Affaires Etrangeres

H. Vernede

Commissaire du Gouvernement

M. Lacrouts

Conseiller Technique

A. Robinet

Conseiller Technique

Caisse Centrale de Cooperation Economique (CCCE)

R. Bailhache

Conseiller Technique

Institut de l'Elevage et Medecine Veterinaire des Pays Tropicaux (IEMVT)

J. R. Pagot

Directeur-General

Office de la Recherche Scientifique et Technique Outre Mer (ORSTOM)

G. Camus

Directeur-General

E. Bernus

Chercheur

J. Fournier

"

Societe d'Etudes pour le Developpement Economique et Social (SEDES)

G. Ancian

Directeur-Adjoint

J. Tyc

Economiste

Universite de Rouen

J. Gallais

Professeur

GERMANY

Bundesministerium fur Wirtschaftliche Zusammenarbeit (BMZ)

D. Treitz

H. Janssen

Neumann-Damerau

T. Harms

Gross-Herrenthey

M. Berg

H. Simon

. Clemens

Bundestelle fur Entwicklungshilfe

F. Bruckle

"

"

"

.Unger

"

"

"

'Ministry of Agriculture'

.Peters

.Hermkes

D. Grumbein

'Ministry of Economy and Finance'

.Osterhaus

Arbeitsgemeinschaft Deutscher Tierzuchter (ADT)

H. H. Messerschmidt

Direktor

ITALY

FAO

P. A. Oram

Secretary, TAC

Agricultural Services Division

T. S. B. Aribisala

Director

L. B. Kristjanson

Chief, Production Economics & Farm
Management Service

N. R. Carpenter

Chief, Operations Service

C. H. Bonte-Friedheim

Operations Service

R. Capitaine

" "

C. A. Morfaw

" "

C. G. Groom

" "

M. Pellissier

Project Manager (formerly WARDA)

Animal Production and Health Division

H. A. Jasiorowski	Director
R. S. Temple	Office of Director
D. G. White	Chief, Operations Service
E. Otte	Operations Service
R. B. Griffiths	Chief, Animal Health Service
G. M. Boldrini	Animal Health Service
E. Knudsen	" " "
J. Rendel	Chief, Animal Production Service
P. J. Auriol	Animal Production Group
A. S. Demiruren	" " "
P. Mahadevan	" " "
I. Mason	" " "
A. Charpentier	" " "
J. M. Westergaard	Meat and Milk Group
J. Renaud	" " "
F. Winkelmann	" " "
Z. Duda	" " "
L. R. R. Reinus	" " "

Plant Production and Protection Division

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ANNEX II

BIBLIOGRAPHICAL NOTE

The Task Force has been impressed with the extent of the literature on livestock research in Africa. We have deposited with the Consultative Group Secretariat both a list of the documents that were brought to our attention and copies of the papers and reports that we have collected during the course of our work, so that these may be passed on to the Centre if and when it is established.

Several review papers and reports prepared the groundwork for the establishment of the Task Force. We have found the following documents to be particularly useful.

1. Report of a Symposium on East African Range Problems, Villa Serbelloni, Lake Como, Italy, June 1968. Edited by William H. Longhurst and Harold F. Heady, Rockefeller Foundation, New York.
2. Guidelines for Planning AID Assistance Programs in Animal Resources Development for Sub-Sahara Africa by G.B. McLeroy and Nels Konnerup, USAID, Washington, November 13, 1969.
3. An International Center for Rangelands Research and Development in Africa South of the Sahara - A Proposal for Cooperative International Action put forward by the Nairobi Office of the Ford Foundation. Pt.I. Purpose and Method by John P. Robin; Pt.II. A Survey of Need by Leslie H. Brown, 1970.
4. Dynamics of Livestock Production in Sub-Sahara Africa by J.M. Fransen, R.H. Khouiri and R. Milford, IBRD, Washington, September 21, 1970.
5. Discussion Paper on Livestock Production in Tropical Africa prepared for Bellagio VI Conference by John A. Pino, Rockefeller Foundation, New York, November 1970.

6. East Cost Fever and Related Diseases, a Technical Conference, Rome, March 1971, Rockefeller Foundation, New York.
7. Livestock Production and Disease Control in Africa by John Pino, Rockefeller Foundation, New York, October 19, 1971.
8. Proposals for an International Livestock Center for Tropical Africa by Glenn H. Beck, Rockefeller Foundation, New York, October 1971.
9. Proposal for an International Laboratory for Research on Animal Diseases by W.R. Pritchard, Sir Alexander Robertson and R. Sachs, Rockefeller Foundation, New York, 1972.

We found the following documents particularly helpful when evaluating the magnitude, and classifying the nature, of the existing research literature.

1. Bartha Reinhold, 1971. Studien uber Fragen der Zebu-Rinderzucht in den Tropen, (IFO-Institut fur Wirtschaftsforschung Munchen Afrika - Studienstelle) (350 references).
2. Deramee, O., 1971. L'elevage des ruminants en Afrique au Sud du Sahara - bibliographie. Belgium: Centre de Documentation Economique et Sociale Africaine (nearly 9,000 references).
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6. Le Houerou, H-N., 1969. Principes, Methodes et Techniques d'Amelioration Pastorale et Fourragere, Tunisia, FAO (236 references).



7. Meyn, K. 1970. Beef Production in East Africa. IFO - Institut fur Wirtschaftsforschung Munchen. (Over 500 references).
8. Pagot, J.R., 1971. Natural Pastures, Forage Crops and Farming in the Tropical Regions of French Africa. Maisons-Alfort: Institut d'Elevage et de Medecine Veterinaire des Pays Tropicaux (176 references).
9. Pagot, J.R., 1971, Cattle Diseases in French Tropical Africa. Maisons-Alfort: Institut d'Elevage et de Medecine Veterinaire des Pays Tropicaux (337 references).
10. Pratt, D.J., 1972. Selected Bibliography on African Livestock and Rangelands, Overseas Development Administration, London (About 300 references).
11. Risopoulos, S.A., 1966. Management and Uses of Grasslands - Democratic Republic of the Congo. FAO (132 references).
12. SEDES, Quelques Etudes Realisees dans le Domaine de l'Elevage, SEDES, Paris (37 references).
13. Van Rensburg, H.J., 1969. Management and Utilization of Pastures - East Africa, FAO (193 references).
14. Wills, J.B., 1969. Contribution to a Bibliography of Animal Husbandry in West Africa from 1960. Ghana J. Agric. Sci. 2 (about 150 references).

This admittedly incomplete list indicates the quantity of literature dealing with livestock in Africa. Much of the older material is located in libraries in the Federal Republic of Germany, France, and the United Kingdom. For the more recent literature, FAO publications contribute a particularly valuable source of material, especially for the new African states.