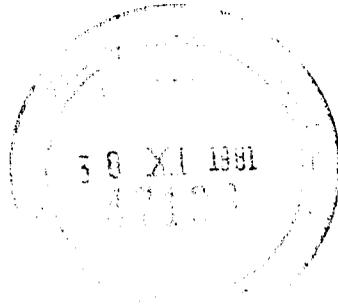


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the future of pastoral peoples

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indigenous models of time and space as a key to ecological and anthropological monitoring

Rada Dyson-Hudson, *Cornell University, Ithaca, New York, USA*

The relationship between ecology and economy is of great theoretical import in an understanding of pastoral nomads. Yet, as illustrated by the discussion between Harvey Croze and Harold Schneider at this meeting, it is difficult to reconcile the approach of the biological ecologist, which focuses on environmental constraints and broad patterns of population movements, with that of the economic and ecological anthropologist, which focuses on individual human activities and motivations. I will not attempt a general synthesis of ecology and economy. Rather, I shall suggest how the on-the-ground approach that anthropologists use for monitoring pastoral population can be integrated with large-scale ecological monitoring, as presented by Croze and Gwynne. A unified approach would provide data about East African pastoral populations and their movements in space and time, both specific information about the behaviour of individual herd owners and aggregate information about the behaviour of the whole population.

The monitoring studies of Croze and Gwynne clearly provide valuable background and backup information for anthropological research. Their conclusion that East African pastoralists are “chasing protein across the landscape” cannot be dismissed because data from their studies document that, as an aggregate, the movements of the East African pastoralists living in arid regions conform with this interpretation. However, as an outgrowth of recent developments in evolutionary and ecological theory, ecologists are increasingly recognizing that, to understand the ecology of a species, it is not enough to determine the distribution and abundance of aggregate populations in space and time. The behaviour of groups is the result of the sum of individual actions based on individual decisions, and the self-interests of each individual are different.

East African pastoralists are part of extremely complex ecosystems, with many interactions within and between trophic layers. Although protein — good grazing for the livestock — appears to be the primary determinant of nomadic movements, there are other factors in both the biotic and the social environment influencing movements of individual herders.

We as researchers must study the differences between individuals, as well as the overall patterns of the groups, to understand the system of livestock management. With a sparsely settled, highly mobile population, actually observing the behaviour of individuals and their herds provides important, detailed information about individual actions and strategies that

can be gained in no other way. However, as a method of monitoring the movements of many individual herd owners over long periods, it is clearly not cost effective. A major advantage of studying humans (as compared with other animal species) is that they have a complex communication system, which can actively supply information. Although what people say they do is not necessarily what they do, asking questions is nonetheless a valuable means to gather information about actual behaviours, as well as about symbolic systems, beliefs, cultural norms, etc.

Nomadic herders have an extremely sophisticated means of communicating information about location and direction. They have very generally known names for environmental features that enable people to communicate information about the location of a herd, or of another individual, and that are regularly used to communicate information. By learning the nomenclature of a particular group of nomadic pastoralists and gaining their trust, one can use their communication system to find out where individuals are, without visiting each one. This involves surveying and plotting local names for landmarks on maps and requires a large initial investment of time. But, once accomplished, it means that by questioning a few individuals, one can find out where many individual herd owners are grazing their herds at one time.

The communication of information about time among East African pastoralists is more problematic. Vocabularies and grammars prepared by European missionaries and administrators generally translate native terms for months as if they correspond to the Western lunar calendar. For example, "the month of the hares" is translated as January; "the month of the mushrooms" as February. But my experience with the Karamojong has been that people often do not agree about what month it is. I believe that because of the unpredictability of rainfall in East Africa, many, if not most, nomadic pastoralists have a relative calendar. Thus "the month of the hares" is when the hares breed, be it December, January, or February; and "the month of mushrooms" begins when the mushrooms sprout, about 6 weeks after the first major rainfall.

It is difficult, but not impossible, to relate the "months" in a relative calendar to our absolute measures of time. The first step is, by questioning the herders, to identify the events in the environment that serve as temporal landmarks in the calendar of nomadic pastoralists. These can be related to the Gregorian calendar by the use of satellite imagery and information from aerial surveys, in conjunction with on-the-ground studies.

If one succeeds in identifying how a particular group communicates information about time as well as about space, then one can gain access to a great deal of information about individual movements at a very low cost. It is then possible to do a ground study, perhaps once every 6 months, or even once a year, and ask particular individuals:

- Where were you in the month of _____?
- How long did you stay there?
- Where did you go next?
- How long did you stay there?

Mapping this information shows both the similarities and the variations in the patterns of movement of individual herd owners.

Among the Karamojong, although all the herd owners were "chasing protein across the landscape," they each moved their livestock in a totally different orbit. And each orbit seemed to be understandable in the light of

such factors as the herder's personal experience, family needs, tolerance of the discomfort of the stock camp, willingness to take risks with disease and enemies, and labour supply. With specific information about individual movements in time and space, it is possible to gain insights into decision-making and the multiplicity of factors that influence each herd owner.

I believe that, before one can predict how development will affect pastoralists, one must first understand indigenous systems of livestock management — not only what people do as an aggregate, but why and how they behave as individuals. Being able to map the movements of individuals in time and space as well as mapping aggregate movements is essential to an understanding of these systems. The adaptive behaviour of pastoral nomads depends to a large degree on spatial mobility. Each herd owner has continually to respond by movement to temporal changes in such environmental features as grazing, water supplies, livestock and human diseases, and the location of human competitors and of friends. Survival depends on regularly finding successful solutions to such spatial problems as: Where is good water? Where is good grazing? How do I find my way to these places? Who will be there when I get where I am going? Pastoral nomads have cognitive models for conveying information about variations in environmental conditions and detailed cognitive maps for communicating information about the location of people and livestock in time and in space. By learning how pastoralists organize and communicate information about environmental conditions and about location in time and space, one can gain information about individual movements in time and space, which can supplement studies of distribution of livestock and human aggregates and can also serve as the basis for studies of decision-making among nomadic pastoralists.

discussion

Little: What do you mean by “chasing protein across the range”? Do you not think that factors are important in determining herd movements other than that of chasing protein? My research in Baringo, Kenya, has revealed that access to markets, especially for grain, is one of the more important factors influencing herd movements. I am sure that, in Turkana, access to famine relief camps is an important factor influencing herd movements.

Western: Chasing protein means that livestock movements are determined by range production. There is no argument with the significance of the factors you describe. Ecology not only is about environmental constraints but about other constraints as well. No one criterion can be used exclusively, and there are other important factors, such as access to markets

Salzman: In studying communication, we must not disregard lack of it, especially when intended. I recall addressing a headman on the main street about a particular pasture. He hushed me up. But, I protested, did not everyone have a right to that pasture? Of course, he whispered, but we have no obligation to tell them about it.

Goldschmidt: The issue posed here is not a true conflict; the ecologist is discussing one order of events while the anthropologist discusses another. The ecologists do not observe the action of every animal, nor are they concerned with its motives. The ecologists only recognize events in general.

Actions as motives illuminate the complexity of events. But these are not in conflict with an ecological causation scheme.

Marx: I notice a reluctance to follow a pastoral group for long. This may partly be because of the belief that the need for protein determines pastoral movements. Many other factors affect movement — markets, shops, transportation, employment, etc.

R. Dyson-Hudson: A study of the movements of a pastoral group over a long period provides information that can be gained in no other way. However, it takes enormous time, and very few groups can be studied in this detail. The method I am suggesting can provide not depth but breadth of information, which is important for monitoring movements and understanding the system.

Khogali: The nomads of the Sudan (and other countries of the Middle East) have their own way of telling time based on the moon and stars. This even enables the nomads to predict rain.

Conant: Pastoral studies are catching up with other aspects of anthropology and are incorporating the cognitive categories of pastoralists. Perhaps we can benefit by earlier work in cognitive anthropology.

Western: Each scholar here has a specific expertise; but the pastoralist has all the capabilities we address. Whether the pastoralist is acting rationally is a difficult question. Why are anthropologists here discussing the future of pastoral peoples without the people? They may have studied pastoralists, but planners have not received this information.

If there is little change in the environment, less labour is needed to control the herd, and vice versa. The notion of stability, implicit in nonmovement and nonhoarding or constant dispersal of animals, is ill-founded. In cattle, a constant metabolic rate is no advantage when resources fluctuate. Cattle do not have a stable metabolic rate in semi-arid areas; those that do need more energy are less able to survive. Pastoral production of milk is a quick exploitation of resources. Here is the answer to the question of why hoard, for rapid returns are possible. Why move? In the best conditions, movement doesn't matter. In the worst conditions, hunting for grass evens out seasonal fluctuations.

Some pastoralists take on other occupations — cattle trading for instance. There has been no systematic comparison of the productivity of subsistence pastoralism with that of commercial ranches. In certain areas, agricultural productivity will be greater. But this is not so in arid lands, where productivity already may be at its highest.

Dahl: I support Dr Western's recommendation for comparisons between the efficiency of different production systems. The political success of a system is based upon its profitability for groups holding political and economic power. Thus, even if a system is less productive for all society, it may bring more profit to a restricted group.

Ayele: I believe pastoralism demands a large labour force. In northeastern Ethiopia, children aged 5 herd lambs and kids. At age 8–10, they herd sheep and goats. At 15, they tend cattle and camels.

Salih: We cannot separate pastoral production from other types of rural production such as traditional farming, hunting, fishing, or cottage industries,

which face similar problems. Recently the balance of political power has shifted against pastoralists in favour of sedentary populations. In contrast is Jordan. Here the Bedouin are close to the state as they constitute most of the army. But in spite of that, pastoralism is disappearing. One can argue that Bedouin settlement is self-generated. Social change is inevitable in pastoral societies. So we have to intervene; if it occurs haphazardly, the pastoralists will be the great losers.

N. Dyson-Hudson: I am presenting aspects of a collaborative research strategy in Turkana, which will be transferred to ILCA over the next 2 years. There are several assumptions underlying this research:

- First, social behaviour is usefully approached as “contingent response” behaviour, as established by Raymond Firth. People approach situations with social and cultural attitudes, and they continually recreate their societies. This approach is useful for the study of change.
- Second, in the savanna ecosystem, a lack of moisture has led to distress. Is a rational strategy for the short run suitable for long-term cycles? Our major problem is to work out a method for dealing with multiple cycles that coincide and interact and to predict behaviour with an averaging procedure.

If the environment is variable, and the key problem is survival, what is the individual response and what is an aggregate survival response? This question focuses attention on the pastoral production system, which in East Africa is characterized by about 30 features. It involves low energy outputs and is labour-intensive; labour involves both sexes and people of all ages. It is high in skill and low in tools. The labour is grouped into family firms, which have accounting procedures and compete with each other. Within the firm, there is a hierarchy of decision-makers. These groups separate and recombine. The expanding human population drives the cycle, aiming to increase stock to meet the needs of the labour force. Ultimately, the political framework guarantees access to resources for each family. However, people can never be completely guaranteed resources, so there is uncertainty. The relation of human to livestock populations is parasitic rather than predatory. Pastoralists are essentially dairy ranching and live off the products of their herds rather than the herds themselves. Pastoralists’ main aim is to ensure continuity of food supply, an essentially subsistence strategy. There is a relatively high ratio of human to livestock numbers, the object being to support a maximum number of people, not stock. The calving rate varies with climate; livestock population growth is low in the dry season as a result of low calving rates and high mortality. Thus, there is an eccentric ratio of supply and demand.

A single-investigator operation was impossible, given the need for the multidisciplinary approach. We needed 6 years to raise the \$500 000 needed for 2 years of team effort. We are studying several problems: the allocation of natural resources within the group, livestock management, the cognitive ecology, human biology, herd structures and dynamics, and pastures. We hope the research will deter massive, inappropriate interventions by developers, which have not worked and will not work. The failure of developers to understand this rests with the social scientists, because we have not been able to give them the knowledge they need for the decisions they have to make.

Marx: It would be a mistake to treat pastoralists as people who engage only in herding. They engage in a variety of economic activities. How does your project cope with this problem?

N. Dyson-Hudson: The interrelation between the human and livestock population is so complex that no anthropologist has come even close to dealing with it. Our intention among the Turkana is initially a focus on human and livestock dynamics. Later we shall attempt comparable precision in dealing with the nonlivestock elements of Turkana survival. We will consider the use Turkana make of wild plants, wild animals, and grass (whether grown or acquired by trade).

Willby: Is it not time that social anthropologists begin future-oriented, rather than retrospective, research on society's views of development options, help choose interventions, and predict the most acceptable and successful? So far, social anthropologists are largely wise after the event and remain uncommitted and uninvolved in the development processes. Although there is no position for a social anthropologist in either of the World Bank range development projects in Somalia, use of such professionals was foreseen in the nonformal education component, and one has already been employed in study of a range cooperative.

Hopcraft: Improvement of welfare is the explanation for what the pastoralist is doing. Economists use the words "income maximization" to cover much of this decision-making, in that goods and services and even social factors can be exchanged and traded for one another.