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EAST AFRICAN PASTORALISM

ANTHROPOLOGICAL PERSPECTIVES AND DEVELOPMENT NEEDS

PAPERS PRESENTED AT THE CONFERENCE

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**/MEETING REPORT/ /EAST AFRICA/ /PASTORALISM/ /ANTHROPOLOGY/
/LIVESTOCK PRODUCTION SYSTEM/ /RURAL DEVELOPMENT/
/ADMINISTRATIVE ASPECT/ /MASAI/ /BORANA/ /TURKANA/ /GABRA/
/SOMALI/**

This collection of conference papers discusses the problems of development planners and administrators and their need for anthropological information, with emphasis on methodological problems in the collection and analysis of information, theoretical issues in the study of society, and the ethical and policy problems facing development personnel. Group ranch development among the Masai is described, and aspects of livestock production among the Borana, the Gabra, the Somali and the Turkana. The maintenance of an ecological balance in the development of pastoral production systems is stressed.

**/RAPPORT DE REUNION/ /AFRIQUE DE L'EST/ /PASTORALISME/
/ANTHROPOLOGIE/ /SYSTEME D'ELEVAGE/ /DEVELOPPEMENT RURAL/
/ASPECT ADMINISTRATIF/ /ETHNIE MASAI/ /ETHNIE BORANA/ /ETHNIE
TURKANA/ /ETHNIE GABRA/ /ETHNIE SOMALI/**

Comptes-rendus de conférence sur les problèmes relatifs aux administrateurs et planificateurs de développement ainsi que leurs besoins en matière d'information anthropologique, soulignant les contraintes d'ordre méthodologique dans la collecte et l'analyse de l'information, les aspects théoriques de l'étude sociologique, et les problèmes éthiques et de principe confrontant le personnel de développement. Le développement des ranches collectifs chez les Masai et les systèmes de production chez les Borana, Gabra, Somali et Turkana sont décrits. Le maintien d'un équilibre écologique dans le développement de l'élevage pastoral y est souligné.

PREFACE

The International Livestock Centre for Africa (ILCA) was established in 1974 with headquarters at Addis Ababa, Ethiopia. ILCA is an autonomous, non-political centre for research, documentation and training, focusing on the livestock production systems of tropical Africa. Its mandate is:

To assist national efforts which aim to effect a change in production and marketing systems in tropical Africa so as to increase the sustained yield and output of livestock products and improve the quality of life of the people of this region.

The pastoralists of eastern Africa are among the major livestock producers of the region, and their areas have been targets for substantial development efforts for a number of years. It was thus appropriate that these production systems were chosen, among others, at the outset as one focus of ILCA's research activities.

Recognizing the importance of anthropological information for the successful planning and implementation of livestock development projects in the pastoral areas of Africa and the considerable experience which had accumulated particularly in East Africa, ILCA sponsored a Conference on East African Pastoralism, held in Nairobi, Kenya from 22 to 26 August 1977. Thirteen specialists in the field were invited to discuss these issues with ILCA staff. Participants included anthropologists and other research workers specializing in the pastoral production systems of tropical Africa, and development planners and administrators with many years' experience in pastoral areas. Given the different interests and backgrounds of the participants, discussion ranged widely: from ethnographic information on specific forms of pastoralism in eastern Africa, to methodological problems in the collection and analysis of anthropological information, to theoretical issues in the study of society, to the ethical and policy problems facing development personnel.

The conference was organized by G Haaland, an anthropologist on the ILCA staff at that time. He and a number of other participants prepared papers for the conference which are likely to be of interest to a wider audience. For this reason, it was decided to issue a selection of 11 of these papers. First the information needs of development planners and administrators are highlighted, and then examples are given of information collected by anthropologists on several East African pastoral societies. This volume was edited by S B Westley and the final text was typed by G Maloba.

**EAST AFRICAN PASTORALEM:
ANTHROPOLOGICAL PERSPECTIVES AND DEVELOPMENT NEEDS**

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**1. PASTORAL DEVELOPMENT PROGRAMMES AND ANTHROPOLOGICAL
INFORMATION FEEDBACK**

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ANTHROPOLOGISTS AND DEVELOPMENT PLANNERS

The relationship between anthropologists and development planners and administrators has frequently been characterized by mutual incomprehension as well as a certain degree of tension. If it is accepted that anthropologists ought to be involved in development planning and implementation, then their proper role needs to be clarified and their relationship with those directly responsible for development work needs to be improved.

As a starting point, one may ask what is the development worker's problem, and what is the anthropologist's problem. Clearly the development worker's problem is a practical task - how to use the means available in order to bring about a certain state of affairs. The most apparent aspect of this task is obviously the technical one - such as controlling or eradicating tsetse, developing an effective vaccine, developing higher-yielding crop varieties, exploiting grazing resources.

Solutions to such technical problems tend to be relatively unequivocal: a certain vaccine either prevents an outbreak of the disease it is designed for, or it does not. The yardsticks for measuring what we may call the first-order consequences of technical performance are thus usually quite clear. Yet, technical solutions frequently have widespread ramifications - second-order consequences affecting human affairs as well as processes in nature in unforeseen ways. For

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instance, construction of deep wells leads to reliable water supply leads to spatial concentration of livestock leads to overgrazing leads to desertification. Such second-order consequences can be anticipated with less certainty and usually with considerably less probability. It is normally far more difficult to establish yardsticks which adequately measure these ramifications.

The applied anthropologist's task is to study these secondary repercussions in the social system. In other words, his problem is a research task - how to discover and document the features of the social system which are relevant in order to anticipate social ramifications with a higher degree of certainty and probability.

Some of the difficulties in the relationship between development workers and anthropologists follow from the nature of their different tasks. Since development is frequently seen as a question of finding technical answers to rather specific problems, development workers involved in implementing such answers frequently have a strong bias against being concerned about, or even considering, the possible wider ramifications of their work. Those who are concerned with these wider consequences are primarily the people who are adversely affected by them, and scholars whose subjects of study are such processes. I believe it is correct to say that in the development process the groups which are most adversely affected are those which usually have the least ability to express their concern. Among the social scientists involved in the study of second-order consequences, anthropologists are in a rather unique position because the nature of their investigations involves prolonged stay and prolonged contact with people. The social implications of technical work are not only manifested to them in changes in a statistical distribution, but also in observations of living people's gains and losses. Consequently they tend not only to stress that technological innovation must be planned with reference to second-order consequences, but also to see themselves as spokesmen for the losers. Quite frequently they explicitly oppose development work of a technical nature. On the other hand, the development worker dealing with specific technical problems frequently sees the anthropologist's consideration of wider ramifications as another obstacle to 'development'.

In recent years, however, there has been increasing concern about such secondary or unintended consequences, a concern which is reflected in a changing

perspective on development. There is a growing realization that development involves socio-economic systems of great complexity, and that the effects of technological solutions in one sector are frequently undermined by processes in other sectors. Planning the direction of socio-economic processes and administering development measures in such a way that their effects on socio-economic processes are consistent with superordinate objectives (for instance fair distribution of income, specified rate of economic growth, maintenance of natural resource base) have become tasks of increased importance in development work. This has widened the scope for cooperation between development planners and anthropologists, provided the development workers understand that social systems and processes are very complex phenomena, and that it is impossible to determine in advance exactly what results will be caused by one's actions or what difficulties will be encountered. The nature of socio-economic phenomena thus introduces a level of uncertainty into the formulation, as well as the implementation, of plans. To the extent that the anthropologist can provide information on the socio-economic system of the population which is being planned for, he may serve to reduce the level of uncertainty and thereby decrease the risk of failure. However although one should require an anthropologist to present information in such a way that it really helps the development planner anticipate the consequences of alternative plans yet such anticipation must not be confused with prediction in the way in which this concept is used in the natural sciences. It is only when dealing with systems in equilibrium, where the elements of *chance* and *freedom* are practically non-existent and the element of *necessity* dominates, that it is possible to predict the relationships between positions of the system in successive time periods. Although the element of necessity occurs in socio-economic systems, the course of their development is also shaped by chance events and by the element of freedom, i. e. man's ability to act not only in relation to present stimuli but in relation to consciously perceived images of the future. It is therefore the nature of socio-economic systems which prevents prediction, not the state of socio-economic theory and method. The state of socio-economic theory and method is, however, of vital importance for how adequately the articulation of necessity, chance and freedom is handled in our models of socio-economic reality.

Given the importance of socio-economic conditions for realization of project objectives, given the essentially unpredictable development of socio-economic systems, and given the confusing state of affairs in the theory and method of the disciplines dealing with the study of such systems, it is no wonder that confusion reigns in the relationship between development workers and social scientists in general, and anthropologists in particular. The reciprocal expectations between development workers and anthropologists - with reference to what the anthropologists should deliver and how development workers should make use of the anthropologists' information - may be inconsistent, but even consistency is no guarantee of mutually beneficial cooperation. Thus the recent growth in travelling 'anthropological' salesmen (i. e. socio-economic experts) who meet the demand for legitimization of projects by 'covering' the 'human factor' is not necessarily a healthy development. A substantial amount of today's so-called applied anthropology or sociology is hardly worth more than the observations and predictions of any person without some social science background, although the work may be presented in an obscure language and backed up with a kind of statistical analysis which best can be characterized as number magic performed on quantified phantasy.

Nor have the contributions of professional anthropologists in development planning been very impressive. To some extent this is probably related to the nature of anthropological fieldwork, which involves prolonged stay in particular communities and is characterized by an intellectual orientation which emphasizes that any behavioural event may be of potential interest as a manifestation of the structure of the social system, and consequently ought to be recorded. Thus anthropologists tend to pay considerable attention to the particular and are rather reluctant to generalize their findings to larger populations, or to sort out what socio-economic relations are particularly relevant for the development workers' problems. Anthropologists frequently also take on the role of 'self-appointed' spokesmen of the groups they have worked with, and actually demand political influence in the selection of the development goals, though their political responsibilities in this process are usually far from clear-cut.

ANTHROPOLOGICAL MODELS

A model is a simplified symbolic representation of some kind of empirical reality, i. e. the symbolic relations in the model stand for empirical relations in the real world. The empirical reality which anthropological models deal with consists of the systems of interdependencies which emerge in people's actions and reactions vis-à-vis each other and vis-à-vis the natural environment. From an applied point of view, it is obviously preferable if the models have a logical structure which allows for formulation of hypotheses about how alternative plans would affect people's reactions and what the wider socio-economic repercussions of these reactions would be. Clearly anthropological models, as reflected in the verbal presentation of the usual scholarly monograph, are not very sophisticated in this respect. Accordingly, it is not strange that development workers tend to look at anthropologists as people who 'know' the 'people' and whose judgement they can rely on as one can rely on the judgement of an art connoisseur. In contrast, I do not think anthropology as a discipline can have much to offer in an applied context unless it can formulate its findings in models which allow for deductive reasoning. Unfortunately there is little agreement within anthropology about the nature of such models or how they relate to processes in social reality. Nevertheless, such models require some kind of assumption or theory about the individual which forms the basic unit of study and a theory of interaction among individuals. In the social field, the units which are taken as individuals are units which operate in a decision-making capacity whether they are individual people, kinship groups, political parties, firms or whatever. The behaviour of these individuals is in response to an environment. Thus, one has to focus on interaction between individuals in order to analyze behaviour, because the environment of any one individual consists of other individuals. Behaviour is therefore interaction; a change in one individual's behaviour constitutes a change in the environment of another. However, the complexities of interaction in social systems are formidable because any interaction is not only directed towards changes in the present environment, but it is most importantly an indirect response to anticipated future changes in the environment; in other words, human interaction involves a fairly advanced level of consciousness. In the suggested model, I thus assume that human behaviour is shaped

by intention and consciousness, and that the environment to which an individual reacts is not really an external, but an internal cultural environment, i. e. his conceptual image of the world which includes an image of space, of time, of past and future, of his role in society, of things that are expected of him, of things he expects from others, his obligations, his rights and so on (Boulding, 1962).

If these assumptions are true, it is - to my knowledge - quite obvious that people will choose the behavioural solution which according to their information will most likely lead to the most satisfactory outcome in relation to their purposes. I will strongly emphasize that the assumptions stated here do not imply the idea that social behaviour is a result of people interacting on the basis of carefully thought-out strategic considerations of all implications of alternative solutions. They rather imply the facile idea that if people have the ability to anticipate and evaluate the consequences of behaviour, it follows that behavioural solutions will be selected in relation to criteria of goal satisfaction. To my knowledge this assumption constitutes a tautology and is consequently empty of content: it contains no information. The tautology is, however, a logic of necessary implication and as such it provides a basis for explaining empirical phenomena, provided that the evidence which substantiates the different propositions in the explanation is derived from independent sources. From this perspective the explanation should have the form of a conditional hypothesis such as the following:

If it is true that people's behaviour is guided by the following purposes (A, B ... N), then variations in circumstances (a, b ... n) produce variations in the attractiveness of different behavioural solutions (1, 2 ... n). While purposes are not directly observable and thus have to be hypothesized, the circumstances defining the opportunity situation for purpose realization can be observed, as well as the actual solutions chosen in various situations. Comparison of the fit between the hypothesized behavioural solutions and observed solutions allows possibilities for testing the assumed 'purposes'.

As I understand, this perspective is consistent with Bateson's (1979) statement that 'an explanation is the mapping of the pieces of a description onto a tautology and the explanation becomes acceptable to the degree that you are willing to accept

the links of the tautology'.

The sociologically relevant dimension of the means-ends perspective formulated here is the fact that ego's purpose is realized in other people's reactions and that some kind of interdependencies between people necessarily emerge when their interaction is affected by reward-seeking considerations. The obvious cost-benefit considerations which are operative on the level of the actor are sociologically interesting only when the empirical conditions steering these considerations are specified.

This perspective on social interdependencies lends itself to analysis in terms of game theory models. In applying a game theory model to a social universe, for instance a group of pastoralists, one needs to collect data which allow identification of the decision-making units (the 'players'), the resources they have in their hands (distribution of the 'cards'), the rules regulating rights in resources and the transfer of such rights (e.g. inheritance, bride wealth, market sales), the rules regulating collective decision-making, the information or image the participants have of their opportunity situation, the values they pursue (the 'pay-offs' they seek), the relevant features of the natural environment, the relevant features of the politico-administrative and economic environment, relevant production parameters, and the number of players involved. Data on such features of social life allow strategic reasoning with reference to the attractiveness of alternative moves (behavioural solutions) under various circumstances. Game theoretical models would thus allow us to deduce the patterns of moves and counter-moves which would emerge under specific empirical constraints. Such deduced patterns can be confronted with observations of the actual empirical patterns of behaviour.

I certainly would expect discrepancies to emerge from such confrontations, but it is through discovery of such discrepancies that we are stimulated to refine our models or improve the data collection which provides the basis for constructing the 'game'. By subjecting our data to bold deductive reasoning and confronting our reasoning with new evidence, we have a procedure which stimulates the development of gradually more realistic representations of the forms of social reality with which we are dealing. In contrast to ordinary games which have a conclusion, the social 'game' never ends as long as the players are accented members of the

community and have the resources to participate in it. We should thus make it clear that a dominant purpose must be for the 'player' to stay in the 'game'. Certain strategies which might be rewarding with reference to specific short-term pay-offs may thus be defeating in terms of the long-term pay-off of staying in the game.

One advantage of such a model is that it allows us to vary some constraints confronting the players conceptually, for example the terms of trade between pastoral and non-pastoral products, access to efficient curative and preventive animal health services, the worker-consumer ratio in the household, administrative guarantees for security of life and property, or climatic conditions over seasons and years. By conceptually varying circumstances like this it should be possible to evaluate the rationality of alternative strategies, e.g. herd composition (age, sex, species), herd movements, distribution of animals in herding units, commercial versus communal herd off-takes.

A most important result of such 'games' would be to discover possible dilemmas between short-term and long-term pay-offs. If we are able to formulate an adequate model which actually reflects the rules on which the society in question is constructed - which make it function in the way it does - we have made a significant discovery. It not only allows us to understand the rationality of the behaviour of members of that society, but it also allows us to deduce aggregate implications, such as income distributions, population dynamics (absorption versus sloughing-off of population increase), aggregate pressures and over-utilization of natural resources, capacity to carry the human and livestock populations through an environmental crisis, contribution of pastoral products to the non-pastoral sector and so forth. Such simulation would consequently allow us to compare the relative adequacy of the institutional structure of different pastoral societies.

For planning purposes, an adequately constructed game model has obvious advantages, since it may allow us to argue out the strategic implications of alternative planning inputs (administrative, technological, informational) for different population categories, and what outcomes one might expect if these strategic implications are realized by members of the society. Although such short-term 'predictions' ought to be attempted, one should not believe that they represent

predictions in the sense used in the natural sciences.

The contribution of this kind of simple-model reasoning is to provide well-founded arguments for what we should not do; however, when it comes to the formulation of statements of what we should do, we are on dangerous ground. No matter how intensive the socio-economic pre-investment studies we have undertaken, the social scientist's main contribution lies in limiting the margin of error in project formulation rather than producing a blueprint for development.

Yet, even if anthropological investigations can never provide a blueprint for development, they allow us to discover unintended consequences of planned activities at an early stage. As I have tried to argue, it is inherent in human interaction systems that it is impossible to determine in advance all consequences of planned action. Consequently, development programmes ought to be built on the assumption that plans will go wrong. Instead of choosing the tactic of controlling as much as possible of the development process (a tactic which has formidable economic and also political costs), programmes should build on sensitivity to information feedback from the environment and the capacity to change tactics when data feedback suggest that the results produced differ from those intended. Such information feedback is here referred to as monitoring. Monitoring is thus neither a technique nor a method, it is merely the policy that in order to reach one's destination one ought to check on the course one is following. What phenomena ought to be checked will depend on the judgement of their relevance for the optimal course of action. Good judgements in this field depend on how well the relevant empirical systems are understood. Realization of objectives in comprehensive programmes, such as those dealing with pastoral development in semi-arid areas, takes place in a context of physical, biological and socio-economic systems. Clearly such systems are very different with reference to the components of necessity, chance and freedom. Consequently, the evaluation models applied to these different aspects of empirical reality also differ, as well as the procedures by which observations are recorded. The differences in observation techniques applied by disciplines investigating different aspects of empirical reality do not, however, imply a difference in methodology. The methodology of a scientific discipline is not a matter of techniques, but of its logic of justification: it concerns

the rationale on which it bases its acceptance or rejection of hypotheses. As I have tried to argue here, this implies that social scientists ought to present their observations as conditional hypotheses. The rationale of acceptance is then a question of whether observations corroborate or falsify these hypotheses

The distinction between technique and methodology can be further clarified by the distinction between the context of discovery and the context of validation (Rudner, 1966). There is no logic which leads us to the discovery of good hypotheses. The context of discovery deals with the conditions (psychological, social, economic, etc) which will be conducive to establishing fruitful hypotheses. For anthropologists the context of discovery plays a fundamental role in how they carry out their investigations. As stated above, the component of freedom is of fundamental importance in the constitution of social systems. Accordingly, not only do the rules which structure different social systems vary dramatically, but man's capacity for innovative thinking is a source of creation of new and unpredictable changes in the strategy of the social 'game', as well as in the rules of the 'game'. The question of establishing a fruitful hypothesis concerning these rules and strategies, and the evolving changes which they are undergoing, belongs to the anthropologist's context of discovery. A central concern of anthropological investigation is thus to be placed in a context which is optimal with regard to stimulating the discovery of good hypotheses. The *raison d'être* for the long fieldwork periods characteristic of anthropological investigations is that they put the researcher in a context which is considered optimal for discovering the significant interdependencies which structure social life in specific communities. There is no doubt that the individual anthropologist's discoveries (the hypotheses he arrives at about the community he studies) are a result of subjective processes involving the anthropologist's theoretical orientation, cultural background, intuition, imagination, ability to learn, special interests and so on. This does not imply that the anthropologist's hypotheses do not correspond to scientific method. Scientific method deals with the context of validation, and this is the context of our concern - when regardless of how we have come to discover or entertain a hypothesis - we raise questions about accepting or rejecting it, that is we raise questions about its logical consistency, its support in observational records, and

its potential falsifiability. In this respect anthropological methodology does not differ from that of other disciplines. A substantial part of anthropological fieldwork is concerned with systematic observations which may serve to corroborate or falsify the anthropologist's hypotheses.

Although a certain amount of anthropological fieldwork has been done among pastoral people in East Africa, it would be unrealistic to expect that the hypotheses entertained at present about the structure of pastoral production systems in this part of the world represent an adequate understanding. Consequently there is a need to follow up and confront the implications of anthropological findings with new observations.

PERSPECTIVE ON EAST AFRICAN PASTORAL PRODUCTION

I shall not try to generalize in the sense of formulating statements about what is common to all empirical forms of pastoral production in East Africa. My intention is rather to identify different analytical dimensions which can serve as a basis for identifying different types of constraining variables whose form and constellation will significantly affect decision-making among pastoral producers, as well as the aggregate forms of regional production systems. For this purpose, I find it useful to try to think of the analytical dimensions as constituting a hierarchy. My approach is to start with the dimensions which cover the most general variable and then move towards variables which identify more and more specific constraints. At each level I shall try to argue out some implications for decision-making.

On the most general level of analysis, the physical process of pastoral production can serve as a useful starting point. The implications of this process can be discussed fruitfully by contrasting pastoral production with agricultural production.

Both agricultural and pastoral production require the same minimum sets of production factors:

- pastoralism requires land (pasture), capital (herd) and labour

- **agriculture requires land (fields), capital (seeds) and labour.**

The land and capital factors are, however, of a different character in the two production regimes, and this difference is likely to have further implications:

- **The income from seeds is more seeds, while the income from animals is more animals plus animal products (milk, wool, blood). The rate of return on seeds is high (10- to 50-fold), so the value of capital inputs is low relative to returns. The rate of return on animals is low (rarely 1-fold with reference to income in the form of animals), so the value of capital inputs is high relative to returns. In its basis pastoralism is thus more capital intensive.**
- **Agricultural production implies investment of labour in particular plots of land. A long time is required until the return to that labour can be realized (the growing season). Control over land, therefore, is of vital importance for the cultivating unit. Pastoral production implies investment of labour in animals, e.g. herding. The time required to extract value from land is short (the time it takes animals to graze); control over land may thus be ad hoc and limited to what is needed in order to let animals utilize particular pastures at specific times. In terms of implications for decision-making, it thus seems more rewarding to compare the two production regimes by contrasting animals and fields as factors of production (rather than fields and pastures, or seeds and animals), and by contrasting differences in the nature of agricultural labour and pastoral labour.**
- **In pastoral production, continuous investment in animals is necessary (the herd capital is perishable and must be replaced). Such investment takes place automatically through the process of reproduction and is only prevented by a decision to slaughter or remove animals. Thus an enterprise in the pastoral sector is always faced with the possibility of rapid growth. In agricultural production investment in land is not necessary since land is essentially imperishable. In societies which lack institutions for land transactions, it is not possible to consume land,**

nor is it possible to invest in land. Consequently, an agricultural enterprise does not have the same inherent possibility of growth. The economic viability problem is thus different for units in the two sectors. The consumption of a pastoral unit can be satisfied not only by livestock products such as milk and wool, but also by direct consumption of animals or of goods exchanged for animals. A pastoral unit falls below the viability level when its consumption requires a herd offtake which is higher than the reproduction rate. Although there may be institutions implying some degree of mutual help in such situations, the high value of animals poses problems for their availability (e.g. by loan). The viability of an agricultural enterprise is different. Given the absence of a market for land, the consumption of an agricultural enterprise is based on its crops. If crops fail, people may starve and even eat the seeds. The contrast with the pastoral situation is that seeds are more easily available because their value is low.

The two types of production show some striking differences in terms of the nature of labour input. In agricultural production a certain minimum labour input is required for the different cultivation operations on a specific unit of land in order to obtain any harvest at all. Increasing the labour input in the different operations will most typically initially lead to increased marginal returns to labour, but these gains will sooner or later decrease until a point is reached where total yields do not increase with additional labour input.

If we look at labour under pastoral production conditions, the situation is more complicated. Let us for the moment limit our discussion to herding. Although there seems to be a substantial variation in the amount of time actually devoted to herding in different pastoral production systems, a certain amount of labour has to be put into herding every day of the year to maintain a herd of a specific size, e.g. 10 animals. If this minimum labour requirement is not met, the herd capital is not likely to be maintained. Once the minimum labour input is provided, however, marginal returns to increased labour input are likely to rise but will then fall rapidly towards zero. If we now look at returns to animals, and

keep labour input constant at a level which maintains maximum output from a herd of 10, some further characteristics of pastoral production emerge. The labour required to herd this small number of animals is sufficient to herd a much larger number, in some cases several hundreds. Thus total production grows proportionally with numbers of animals (the marginal product of animals being constant) until a point is reached where the herd size is bigger than the level which can adequately be controlled by the given labour input - a point at which marginal returns to further herd increase diminish rapidly. This implies that the productivity of a given labour input increases dramatically with an increase in the scale of production. In an agricultural situation, however, if we keep labour constant at a level sufficient for the different cultivation phases of a certain unit of land, we will expect a steady decrease in the marginal product of land as the area under cultivation is increased.

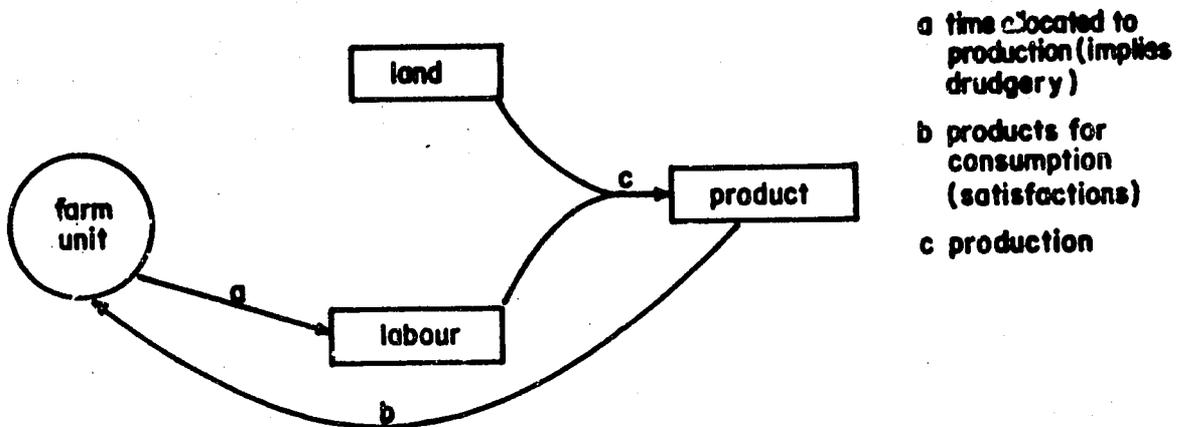
This comparison of the production process in pastoralism and agriculture indicates that the two production regimes present different possibilities and limitations. A pastoral producer has to commit a certain amount of labour to herding; when this labour is committed, there are no factors in the physical process of production which might limit his interest in increasing the size of his herd up to the number of animals which can be handled with the labour available to the household (other tasks, such as manual watering of animals from deep wells might conceivably work as a disincentive, because for these tasks labour input increases proportionally with the number of animals). For an agricultural producer the situation is different: on the one hand he has clear incentives to increase the land under cultivation because it increases his food supply; on the other hand there are clear disincentives because the increased amount of labour which will have to be committed to production implies increased drudgery (Nakajuma, 1970).

The fundamental economic dilemmas are thus different in pastoral and agricultural production. For a pastoral producer the dilemma is the balance he strikes between consumption from his herd and investment. Every event of consumption (utility of immediate consumption satisfaction) implies a reduction of productive capital (disutility of the decrease in future income). For an agricultural producer this is not a dilemma under the conditions we are discussing here.

For him the dilemma is to balance the drudgery (disutility) of labour against the satisfactions (utility) derived from the returns to labour, as shown in Figure 1.

Figure 1

BASIC CHARACTERISTICS OF AGRICULTURAL PRODUCTION SYSTEM

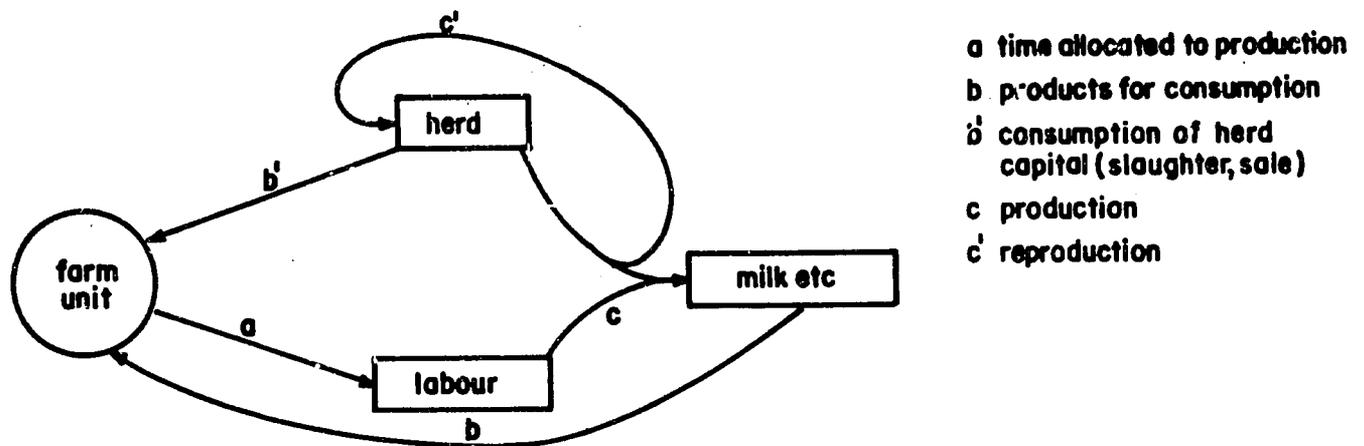


- a time allocated to production (implies drudgery)
- b products for consumption (satisfactions)
- c production

The question is thus how to balance a and b. For a pastoral producer, the situation is as shown in Figure 2.

Figure 2

BASIC CHARACTERISTICS OF PASTORAL PRODUCTION SYSTEM



- a time allocated to production
- b products for consumption
- b' consumption of herd capital (slaughter, sale)
- c production
- c' reproduction

The basic problem is not to balance a against $b + b'$, but b' against c' , i. e. to avoid getting into a situation where consumption needs require a herd offtake which is higher than herd reproduction. To keep $c' > b'$ is the herdsman's daily concern;

labour drudgery is not a factor limiting productive output in this case.

Given the growth potential in the pastoral sector and given the different importance of labour drudgery in the two production regimes, I would furthermore expect that where both production possibilities are open, cultivators would tend to convert agricultural surplus into livestock and - if they succeed - devote gradually more of their time to this activity. In other words, one would expect a flow of investments and personnel from the agricultural to the pastoral sector.

The purpose of this very simplified discussion of the physical process of pastoral production has been to try to identify characteristics of this process which would tend to channel decision-making in specific directions. However, in any empirical situation of livestock production there will be a multitude of other factors which will support or counteract these decision-making implications. So far, I have only discussed decision-making in terms of husbandry problems, i. e. decisions relating to capital management in terms of investment and consumption of herd capital, in terms of labour input in relation to herd units and so on. Most pastoralists in semi-arid areas are faced with another decision-making problem which is of fundamental importance for their herd growth, namely the herding problem - how to keep the animals under conditions which at any time are optimal for their welfare. The structure of the natural environment is clearly of fundamental importance here. The herdsman's distribution of his livestock wealth in relation to pasture, water, possibly also salt, and risks of disease and predators over the day, over the season and over the year is obviously affected by his knowledge of the natural environment. The characteristics of the environment will select certain herding strategies as more rewarding than others, and a main task for anthropologists should be to explain the rationality and adequacy of the observed strategies. A specific problem encountered in areas which are exposed to erratic climatic variations follows from the fact that the relative productivity of different livestock species varies from year to year depending on climatic conditions in specific years: some species are more productive in good years, others more able to survive drought conditions. In such a situation, environmental conditions may favour a husbandry strategy which is geared towards distribution of animal wealth over several species, e g. camels, cows, goats, sheep and donkeys.

Since these species have different environmental preferences, the implications of such a husbandry strategy for herding decisions are obvious - different animal species favour different localities in different seasons and this increases the labour requirements for herding and supervision. Under such conditions, labour availability may actually be a limiting constraint on herd growth and a fundamental problem becomes to identify the mechanisms for allocating labour to animals, not only internally in a production unit, but within the larger pastoral community as a whole. The great variations in amount and reliability of rainfall between the more favoured East African pastoral areas, such as Masailand, and the more arid areas, such as northern Kenya, obviously have implications for the animal species kept and the number of man-hours which have to be put into production. This would probably imply that efficiency in satisfying labour requirements for viable herding units has constituted a more important selection pressure in the evolution of organizational forms among pastoral groups in the more arid areas than it has among pastoralists in the more favoured areas.

So far in my discussion I have mentioned physical factors which would tend to channel pastoral decision-making in specific directions, but in order to move further towards the real level of decision-making we have to consider the organization of the decision-making units. The organization of these units has implications for the available behavioural solutions. We are here concerned with the institutional rules regulating control over animals, control over labour needed to maintain the animals and control over animal products. The nature of these rules and the social sanctions maintaining them have implications not only for individual livestock management, but also for aggregate outcomes. Let me take one important variable. Is the herd-controlling unit also a pasture-controlling unit, or is it not? If it is also a pasture-controlling unit, then the scope for management is dramatically increased because the controlling unit has the possibility of optimizing the relation between the fodder resource and the animals feeding on that resource. If the herd-controlling unit is not a pasture-controlling unit, it can only maximize the wealth it is able to convert from the free or communal resource to its individual property. This is, however, likely to have certain long-term implications which I find rewarding to discuss with reference to the specific sets of

balances which characterize pastoral adaptations (Barth, 1964b) :

- **The pasture is finite, i. e. there is a limit to the number of animals a particular area can carry. When the number of animals approaches this limit, starvation occurs and the animal population is regulated by reduced reproduction and increased death rates. There is thus necessarily a balance between the number of animals and pasture resources.**
- **The household requires a herd big enough to provide an income sufficient to satisfy its consumption needs. There must thus be a balance between the number of people in the household and the number of animals required to satisfy the consumption needs of the household.**

These two sets of balances define the characteristic problem of a pastoral adaptation. Growth of the human population requires growth of the animal population. The growth of the animal population will, however, sooner or later reach the limit set by the carrying capacity of the land. The outcome of such processes depends on organizational factors.

One would expect growth of human and animal populations to favour evolution of institutional mechanisms which either served to eliminate surplus personnel from the pastoral area or allowed the expansion of the pastoral groups over a larger area. I will suggest an important difference between Sahelian/Sudan pastoralists and East African pastoralists in this regard. Among the former category, selection pressures (most importantly the presence of large-scale states integrating different ethnic groups under one political authority) have favoured evolution of institutional mechanisms for sloughing off surplus personnel; whereas among East African pastoralists, selection pressures have favoured evolution of institutions for the political mobilization of personnel for territorial expansion. If political support is one aspect of these institutions, the other interconnected aspect is the economic support and risk sharing they imply. Although animals can be said to be 'owned' by individual management units, any owner is likely to be indebted for and have claims on the animals of others.

The most important institutional mechanism which serves to relieve population pressure is the high level of individual household responsibility in

economic management typically found among Sahelian/Sudan pastoralists.

Individual household responsibility in a pure pastoral adaptation has implications which serve as a negative feedback when pressure increases. Population growth and increased pressure on the pastoral niche lead to decreased income per animal, which means that the minimal size of herd required to maintain the viability of the household increases. With individual responsibility, this leads the households who fall under this minimal level to invade on their livestock in order to satisfy their consumption needs. Pressure on the niche therefore does not cause the whole group to lose viability, but leads to a selective exclusion of individual households from the pastoral adaptation. The important thing is that this control on population in pastoral adaptation intervenes before starvation occurs for the pastoral group as a whole. In an adaptation of specialized pastoralists with individual responsibility, there are thus negative feedback mechanisms which regulate the pressure on pasture. When pressure and overgrazing increase, the exclusion process from the nomadic population increases, and the pressure is relieved. It is thus possible to maintain a long-term stability in the pastoral adaptation.

The level around which the stocking rate (the total number of animals held by the members of the pastoral group exploiting a given pasture area) fluctuates depends on two variables:

- The sensitivity of the pasture to overgrazing. This is a question of the relationship between two thresholds, the threshold at which overgrazing occurs, i. e. the carrying capacity, and the threshold at which pressure on pasture increases the households' viability level to a point where the sloughing-off rate becomes higher than the reproduction rate. If the first threshold is higher, the stocking rate will fluctuate around a level below carrying capacity. If the second threshold is higher, the stocking rate may fluctuate above carrying capacity, a situation which would lead to overgrazing. As far as I know, this last situation is rare in purely pastoral adaptations. Carrying capacity is here not thought of in absolute, but rather in relative terms, i. e. relative to the grazing regime. In this sense, carrying capacity is expected to vary in relationship to the way the animals are kept on the range, and we therefore expect that the number of

animals which can be kept within a given region on a sustained yield basis will be significantly affected by herd management.

- The consumption profile of the pastoralists. If the consumption profile consists mainly of products from the pastoral sector, the viability level (and thereby the sloughing-off process) is directly related to pressure on pasture. However, if the consumption profile includes a substantial amount of products from outside the pastoral sector, the viability level is significantly related to the relative prices (or barter rates) of pastoral products and other goods. In a situation where local pastoral and agricultural production is drawn into national and international markets, the viability level depends on the supply and demand forces operating in these markets, and is thereby likely to be subject to short-term fluctuations.

Among East African pastoralists, the exclusion processes which operate at the level of individual households' loss of viability seem to be counteracted by other processes. In this area, complex institutions have evolved facilitating circulation of livestock and livestock products among individual units and serving as a kind of security for poor households. Such institutions for sharing and mutual help reduce the economic exclusion rate from the pastoral group. I have suggested that the solution to the problem of maintaining the balance between men and animals in such a case is territorial expansion. In fact, groups with elaborate institutions for sharing may have an adaptive advantage over other groups in the pastoral niche if these institutions also serve to mobilize larger population segments in a politico-military organization. In a politically anarchic situation, the ecological balance may thus be maintained by a process of political exclusion of whole groups from the pastoral niche.

One would thus expect that politico-military efficiency has constituted an important selection pressure in the institutional development of East African pastoralists. Especially among groups in more favoured areas, where the time requirements for herding are comparatively small, one would expect the organizational capacity of a group in the politico-military field to be a dominant factor in its ecological adaptation.

The argument pursued so far has some implications for our perspective on institutions regulating reproductive performance in pastoral groups. On the one hand, one would expect economic forces to favour institutions which reduce fertility, because households with many children require a larger offtake from their herds in order to satisfy their consumption needs. Consequently, the risk of losing economic viability is greater among such households. On the other hand, in a politically anarchic situation one would expect selection for institutions which stimulate high fertility, because the maintenance of groups depends on the number of people that can be mobilized in confrontations. Thus, small groups have a greater risk of losing political viability. In such a situation, a group's chance of maintaining its adaptation to a pastoral niche is significantly dependent upon the number of people which can be mobilized for defence and attack; consequently one will expect institutional forms which produce formations of larger population segments against competing groups. In the absence of market opportunities for livestock transactions, it is not surprising that cattle are used as a medium to express and cement these commitments, i. e. that the institutional rules regulating commitments for political support also regulate circulation of livestock and livestock products among the households in the group. As pressure on pasture increases, one would also expect the political selection pressure to increase. Traditional pastoral societies may not after all have been so unchanging as is often assumed. Cases in point are Sahlin's (1961) and Newcomer's (1972) discussions of the emergence of Nuer lineage organization. In a situation of growing pressure, this organization is seen as having adaptive advantages vis-à-vis the Dinka political organization. Consequently over time Nuer social organization gradually replaced Dinka social organization. A similar analysis of the politico-military implications of various East African systems of descent, age and generation in specific natural environments would probably increase our understanding of ethnic distribution in this region.

In the present situation, however, where inter-group relations are regulated by an external administration, the traditional institutions are becoming less and less adaptive. On the one hand, people have vested interests in maintaining their connection to their group since they have claims on the resources of other households.

On the other hand, population increase cannot be adjusted by territorial expansion. Thus, the fact that some groups have developed organizational mechanisms which are highly effective in terms of the number of people they accommodate within a pastoral region, even in periods of environmental crisis, may have the unintentional effect of stimulating over-exploitation of the natural resources on which their adaptation is based.

Let us now look at situations where pastoral producers can combine animal husbandry with agriculture. In such cases, pressure on the pastoral niche will not automatically lead to selective exclusion of personnel from pastoral activities and thereby relieve the pressure. Instead, as the income per animal decreases (the subsistence importance of pastoral activities decreases), marginal households maintain their consumption level not by eating their animals, but by income derived from agricultural activities. Thus, their adaptation is not as sensitive to pressure on pasture as a purely pastoral adaptation. Despite pressure on pasture, a growing human population may maintain a large animal population which is of decreasing subsistence importance, but still of importance as a store of wealth. Ultimately the number of cattle is controlled by the carrying capacity of the pasture. The problem is, however, that the lack of sensitivity to pressure on pasture is likely to lead to overgrazing and thus reduction of carrying capacity. The difference between this situation and that which prevails under a pure pastoral system is depicted in Figures 3 and 4.

Figure 3

STOCKING RATE AND CARRYING CAPACITY IN A PURE PASTORAL PRODUCTION SYSTEM

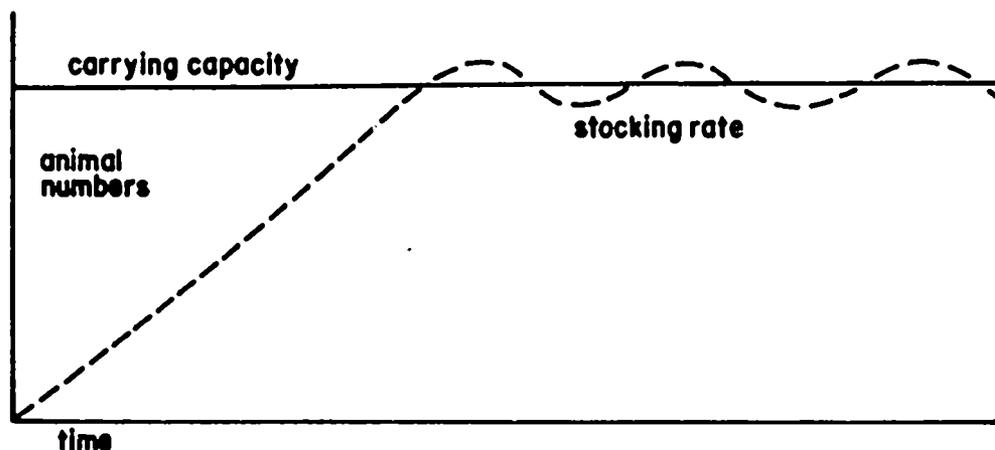
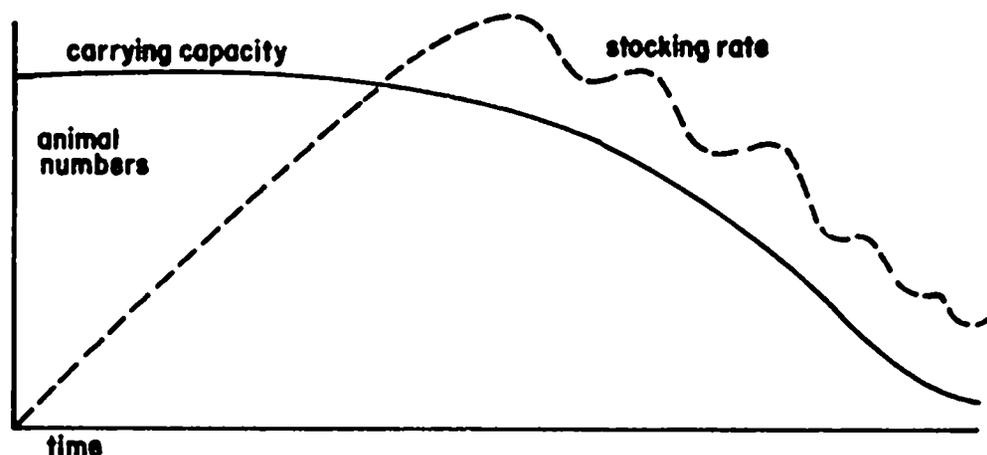


Figure 4

**STOCKING RATE AND CARRYING CAPACITY IN A MIXED PASTORAL-
AGRICULTURAL PRODUCTION SYSTEM**



At the same time as there is an increasing flow of activities and people out of the pastoral sector and into agriculture, there may be an increasing flow of capital in the other direction. Attempts to relieve the pressure on pasture by increasing the productivity of agriculture may in this way have the opposite effect, namely of increasing overstocking. This is likely to occur as long as agricultural and pastoral land is communal or free, even in a situation where agricultural production is significantly directed towards the market. The direction of the flow of capital between the sectors may, however, be modified if there are opportunities to invest in agricultural production or other non-pastoral activities.

I have tried here to discuss levels of constraints whose empirical character will have implications for decision-making in the pastoral sector. In a sense, the different dimensions discussed here could serve as an attempt to develop a comparative framework for the study of pastoral societies. Development of such a framework is important because it provides a background for what we see as problematical in the specific cases we study, in other words it stimulates us to question the material on the basis of expectations derived from such a framework. Falsification of expectations should stimulate us to formulate more adequate hypotheses which include a more comprehensive set of significant constraints. A brilliant attempt in this direction is Dahl and Hjort's (1979) book *Having Herds* where, on the basis of figures available in the literature on herd characteristics

(calving rates, mortality, age at first calving, milk yield, etc.) and pastoral household consumption requirements, they argue out the implications for herd growth and herd recovery after a crisis, such as drought or pest infestation.

This approach is highly productive because it ought to stimulate future research workers to collect data which can be confronted with Dahl and Hjort's model simulations. I expect this will reveal discrepancies which need to be resolved - either by showing that the data which have been fed into the model were insufficient or by showing that other processes have also been operating. For instance, the importance of grain in the diet of pastoralists in the Sudan savanna makes the sale of beef cattle (for consumption in urban areas or in the Middle East) of fundamental importance for understanding viability problems.

DEVELOPMENT NEEDS

2. PASTORAL PLANNERS' NEEDS FOR ANTHROPOLOGICAL DATA

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INTRODUCTION: A DEFINITION OF TERMS

There is an increasing demand for anthropological data as a basis for planning development programmes for pastoral areas. In part, this demand arises from a genuine recognition by the planners themselves that they need this information and that the failure of many such programmes in the past sprang from excessive preoccupation with purely technical factors with insufficient regard for the human element. In part, however, the increased demand for anthropological data arises as a self-defensive response by planners to complaints by academic anthropologists who have been concerned with pastoral societies and who are indignant because previous development programmes have appeared to ignore their special knowledge of these societies. A large part of the increase in demand comes as a result of pressure from the international agencies who are expected to finance development programmes and who feel that these programmes present particular problems which anthropological data can elucidate. This paper attempts to explore what type of anthropological information is being demanded, how it can be used, and the role that anthropologists can play in providing this information to planners. No distinction is made here between sociologists and anthropologists; perhaps the term social anthropologist could be used.

What sort of anthropological data are in fact demanded? If international financing agencies require anthropological studies as a prerequisite to investment in pastoral areas, whereas in other areas they put more emphasis on micro-economic studies, this could be because they believe that in pastoral areas 'non-economic' motivation is relatively more important; or because they believe that they already understand enough about such non-economic factors in those other

areas, and so do not require special anthropological studies such as they require in pastoral areas; or because the only in-depth field studies of pastoral areas that have been carried out have been by anthropologists, so that an in-depth study has come, by association, to imply an anthropological one. The first two of these reasons suggest that there is something unusual about pastoralists; the last implies that anthropologists have something special to contribute.

Anthropological data may be very broadly defined as information, including both descriptive facts and conceptual models, about pastoral people, in contrast to information about their physical environment (soils, climate, vegetation, water) or about the physiology of their livestock. Together with other information, a planner needs anthropological information on which to base forecasts about the future as well as descriptions and analyses of the past and present. Thus broadly defined, anthropological data will include, *inter alia*, information about the way in which pastoral people use their energy and time, about their demography, about the way in which they manage their livestock and physical environment (including their patterns of movement), about property rights in land, water and livestock, about the distribution of income, wealth and power, about the factors which influence decisions made by individuals, households or larger groups, about the way in which these decisions are made, about patterns of production, consumption, exchange, income and expenditure, about the relations of groups of pastoral people with each other and with outsiders, and about the interactions between all these factors. Except where they clearly influence the factors listed here, a pastoral planner will not be particularly interested in the details of religious observances, ceremonies, witchcraft or human physiology - although these could also be defined as anthropological data.

The definition of an anthropologist is more difficult. Clearly, much of what has just been classified as anthropological data would, in a non-pastoral context, be considered to fall in the fields of economics, law, geography, management and possibly psychology. Yet some anthropologists who have worked extensively in eastern Africa appear to hold fairly strict views about what sort of person could properly claim to call him- or herself a (pastoral) anthropologist - views which lay more stress on experience under suitable guidance than on the use of particular

techniques or the acquisition of particular academic qualifications, and which, to the outsider at any rate, bear some resemblance to arguments in favour of a 'closed shop'. Part of the objective of this paper is to question whether the sort of anthropologist who publishes the traditional sort of account, of the 'Cow and King: An essay in duocracy' type, is uniquely or particularly qualified to provide anthropological data to planners.

Pastoral planners may be drawn from many different academic disciplines or professional cadres, and may be located at many different points in bureaucratic structures. They may be veterinarians, range management or animal production specialists, water engineers, foresters, economists, sociologists or generalist administrators. They may be located in district, regional or ministerial offices, in bilateral or multilateral financing agencies, or in consulting firms. A planner is defined here as anyone who assembles and analyses data in such a way as to provide guidance to decision-makers or executives, based on objective and rational criteria; and the plans that such planners provide may relate to very specific projects, to broad programmes or to general policies in the pastoral sector. Probably social scientists tend to believe themselves uniquely qualified to carry out planning functions, both because they see their professional skills as covering the entire range of human activities and interests and because they view their disciplines as being particularly concerned with the optimum allocation of scarce resources between competing uses and claims. However, social scientists' claims to pre-eminence in this field are unlikely to go undisputed by other disciplines whose adherents in many cases actually occupy key planning positions, and who often feel that their own practical experience as deliverers of commodities and services for which pastoralists actually express a demand is a better qualification than the analytical skills of the social scientists. Social scientists have still to convince many key decision-makers of the usefulness of their skills as well as, in some cases, their personal commitment to trying to change pastoral life in a desirable direction.

ANTHROPOLOGICAL DATA AS A GENERAL PICTURE OF PASTORAL LIFE

Anthropological data, widely defined, can perform two rather different functions in improving the planning of pastoral projects. The first of these is to provide a general and all-inclusive picture of the nature of pastoral life, the ecological constraints under which pastoralists operate, the way in which they adapt to these constraints and the functions performed by their social institutions. Anthropologists might be said to construct a conceptual model of pastoral life which shows in general terms how and why different physical and social elements are related to each other. It is helpful, of course, if the general picture or model is of the particular society for which a development programme is currently being planned, or if individual pictures exist of all the pastoral societies within a nation's boundaries. But even if a general picture is provided, rather than one of the particular pastoral society currently under consideration, much will have been achieved if planners are enabled to see that what at first sight appear to be cultural or ethnic curiosities, which might be attributed to ignorance or primitiveness, are in fact subtle responses to the natural and political environment in which the society is situated. Such understanding will restrain planners from intruding hastily and will enable them to see what they will have to replace if, in the course of development, they destroy what was there before.

General pictures of pastoral societies require, if they are to be accurate and complete, an unhurried approach to field work and analysis in order that the researcher may gain the confidence of members of the society being studied and have time to develop his ideas. Such pictures are the traditional expression of academic anthropologists' periods of field work, and the relative emphasis given, for example to management of livestock and land in contrast to age-grades or ritual, depends on the interests of the individual or of the academic school to which he is attached. Clearly among the general pictures which have been constructed by anthropologists, much of the material, and in some cases most or even all, could have been collected, handled and analysed by, for example, ecologists, geographers or economists, in the sense that specifically anthropological concepts or research tools (equivalent to linear programming in economics or determination of *in vitro* digestibility in animal science) were not required, but rather a willingness and dedication to look at the pastoral scene as a whole rather than at only one aspect of it.

An obvious problem with obtaining a general picture of a particular society for which a development programme is being devised is that the period of time required to construct the picture may be at variance with the time-scale for investment planning and decision making. It is easy enough to say that the process of planning must adapt itself to the requirements of the situation, but the planning process too has its own rationale. It can be disrupted and amended - but not without cost, including the cost of completely missing a politically favourable moment for getting funds for pastoral development. Perhaps the greatest problem with general pictures or models of particular pastoral societies, however, is that often they are presented in essentially static terms ('this is how this society is functioning') while in fact, not only in the 1980s but probably always, the picture is changing rapidly. One ought not to be concerned as a pastoral planner, although one too often is, with moving from stage A to stage B. One is already on a moving escalator and the decision to be taken is not where to get on and off but which fork to take in the way ahead. The pictures painted by anthropologists do not always contain this element of dynamism, and when they do, they often still look back to past changes rather than into the future.

ANTHROPOLOGICAL DATA AS ANSWERS TO SPECIFIC QUESTIONS: A CASE STUDY FROM ETHIOPIA

The second general function of anthropological data is to provide answers to specific questions arising during the course of development planning. To illustrate this function, a case study will be presented of experiences in planning pastoral development in Ethiopia in the early 1970s. The author was a member of a multi-disciplinary planning team in the Ethiopian Government's Livestock and Meat Board, responsible for identifying, planning and preparing to the point of implementation new livestock projects to be financed by the World Bank. Such projects are a rather special form of livestock programme, and not one which everyone believes to be appropriate or valuable. Nevertheless, the sort of planning decisions which were made in this case and the kind of information required were not very different from those facing other livestock planners in other countries.

Most of the projects that were planned involved pastoral communities in arid and semi-arid areas. In five out of the six projects which were prepared (and

in two other cases that aborted) a socio-economic study, yielding anthropological data, formed an integral and early part of the planning process. It was found that far more anthropological information was collected than could be used in the course of planning, and that what was used filled two rather different roles. The first role was in designing the overall content and the precise shape of the package which was put together, and the second was to enable a preinvestment evaluation and justification, in terms of decision-making criteria (e.g. social cost-benefit analysis), of the package which was formulated. In principle there should be no distinction between these roles. A constant reiteration of evaluations of alternatives should, in theory, lead to a constantly improved design. In practice, however, the two roles of design and evaluation tend to be distinct. It is only possible to look at a few major alternatives in detail at the planning stage and the rest is designed more or less intuitively, ending up with a detailed costing of the final package and a subsequent evaluation whose results are awaited with somewhat baited breath.

Some of the anthropological information which was collected in Ethiopia, but which could not be used directly in either of the roles just described, was, nevertheless, indirectly useful in improving the planners' general awareness of the planning context and, to a lesser extent, in improving awareness in other circles within government. But such awareness is best promoted by the publication and general public discussion of background studies over a long period rather than by semi-confidential government reports which have limited circulation and offer little opportunity for criticism or discussion.

A socio-economic survey of one region proved more effective than a parallel survey by veterinarians in determining the relative importance of different animal health and associated problems. This was because the socio-economic survey approached the problem from the point of view of the animal and its owner rather than from the technique of diagnosis. As a consequence, a hitherto unsuspected number of livestock lost to predators was revealed, as well as other, though less reliable, information on the timing and relative extent of other hazards and diseases. This information played an important role in determining the relative emphasis given to different aspects of the veterinary programme.

A socio-economic survey was also an important element in the decision on what form of organization the veterinary service should take. In one region, rather detailed information was collected on the timing, rationale and extent of seasonal migrations, partly also derived from an aerial survey. This led to the conclusion that only mobile veterinary facilities following certain general seasonal cycles were likely to be effectively utilized. In other regions, where less complete socio-economic surveys had been carried out, it was proposed to follow the same pattern of organization as in the fully surveyed area, though in these other regions this pattern may have been a good deal less appropriate.

The decision was taken that the most junior level of veterinary staff, called 'veterinary scouts', should be selected more or less irrespective of their academic achievements from within and by the pastoral communities concerned, and that they should, after a short period of training, return to these communities. One important piece of information was lacking, namely the appropriate social unit within the tribal structure to which a veterinary scout should be attached. In the end the scale of staffing intensity was decided on the basis of a conventional extension worker: farmer ratio of 1:300, in the hope that some way of fitting this ratio into the social structure would emerge. An appropriate formula may not emerge, however: if, for example, social units of about 50 families follow more or less the same migratory movements, then provision at the scale of 1 scout to 300 families may lead to complete failure. An inappropriate number of scouts will probably be captured by the privileged few, and as a consequence the resentment of the majority may be aroused to the entire scheme.

A tentative map of tribal/clan water and grazing rights was felt to be an essential element in the process of planning the location of new water facilities and associated range-management units. In some cases such maps were obtained from socio-economic studies. In the areas where this information was not obtained, the range- and water-management programmes that were planned may be neither viable nor useful. On the other hand, the demand for a map may have constrained the information collected on water and grazing rights into an inappropriately static and two-dimensional framework, whereas in fact the situation is changing over time. Corresponding to this map of water and grazing rights, descriptions of intergroup

relations were also used to indicate the feasibility and appropriate operation of facilities to be shared by communities.

Information was sought on traditional and current social control of water and grazing in order to consider to what extent existing institutions and procedures could be used to manage new installations or grazing systems. However, the information obtained was not very helpful or enlightening. Information on the use of water provided a picture of the formal structure of rights and powers without any very clear idea of how or on what grounds these rights arise or how decisions to use powers of control are reached. In the case of grazing, the information obtained almost invariably indicated quite undifferentiated grazing rights and very little social control over the numbers, types and classes of stock grazed, or over the period of grazing. This picture may well be inaccurate. Perhaps the wrong questions were asked, or in the wrong way, and behind the unsatisfactory picture there may be lurking a vivid and dynamic reality of social control of resources. It may be, however, that planners and others from the developed world who are concerned with range management invest an inappropriate degree of importance in the concept of social control of grazing and that the blurred picture obtained reflects patterns which are of only marginal real importance.

The likely viability of new participatory resource-managing institutions, such as informal range-users' associations or more formal quasi-cooperative structures, also needed to be assessed. These might operate within traditional social boundaries (e.g. encompass a single clan or tribe) or across them. These new institutions would parallel but would not derive their authority from traditional ones, although the same individuals would tend to occupy prominent positions in both. Information was required on the sort of functions which could efficiently be carried out by such participatory institutions.

Information was also needed on the social implications of allocating particular pieces of land for new cooperative ranches: the degree of acceptance or hostility to such allocations, the way in which a community decision on such allocations might be made, and the extent to which such a community decision would be regarded as binding over an extended period of time.

Information was needed to predict whether a cooperative ranch which took pastoralists' male cattle at 12 to 18 months for fattening at an accelerated rate would obtain an adequate supply of young stock. The intention was to make a part-payment (including a profit-sharing element) at the time of their sale. The success of such an enterprise depends, *inter alia*, on the nature of property rights in individual animals and on the role of cattle sales in the pastoral economy. A judgement also had to be made on whether the proposed cooperative management system for the ranch could be expected over time to extend successfully to a feedlot located at a considerable distance from the area where the cooperative members live.

In order to formulate a breed improvement programme, information was required on pastoralists' current practices regarding the selection of breeding stock (especially herd/flock sires).

Several of the projects which were planned also contained components for initiating or improving rain-fed or irrigated crop cultivation. Such components would inevitably imply changes in existing land-tenure conditions. It was felt that new land-tenure conditions out to be designed to lead to:

- conservation of the environment (i.e. they would include rules on land use)
- the efficient use of new resources (e.g. irrigation water)
- improved social equity.

In addition, they must be understood and accepted by the potential participants and by the communities concerned as a whole. Land-tenure arrangements would involve both the allocation of rights to cultivate (and hence revocation of any pre-existing rights to a particular plot of land) and also continuing control over the use of the land and water. Information was needed to determine what demand there would be for rights to cultivate, what distribution of these rights would be socially equitable, and what system of land tenure would obtain the pastoralists' understanding and consent.

The potential availability of labour also needed to be ascertained before labour-intensive road construction programmes could be planned: how many workers would be available, at what seasons, and for how long a time?

Cooperative flour-mills and a system for the retail distribution of consumer goods were also planned as part of the project. The demand for such services had to be estimated.

REFLECTIONS ON EXPERIENCE

Only part of the anthropological information needed to design livestock development projects in Ethiopia was actually made available to project planners. In some cases this failure arose because the planners did not realize early enough in the planning process what the critical issues were going to be. When livestock projects are designed, a number of studies are carried out simultaneously, and the results of each tend to modify expectations from the others. Carrying out such studies in the right order may be difficult, or even inherently impossible. In most cases it makes sense to carry out a socio-economic study at the beginning to reveal the critical technical constraints on development, each of which will require detailed investigation. These detailed technical studies then raise further socio-economic questions - and so on. Clearly there has to be a limit to the number of rounds of studies which can be carried out. Even with only one round carried out in Ethiopia, about 5 years elapsed from the time when a new development area or opportunity was identified to the point at which any development activities actually took place. This time is necessary to decide on terms of reference for studies, to select researchers, to do the field work, write up the results and incorporate them into detailed plans, and finally to secure the necessary finance and to recruit and appoint the staff to execute the project. Such a time lag is fairly standard for countries in which very little previous development activity has taken place in pastoral areas.

In some cases, planners in Ethiopia asked relevant questions but failed to get satisfactory answers. In discussion of an earlier draft of this paper, a number of participants in the conference suggested this was probably due to the studies having been carried out by inadequately qualified people. Naturally, the quality of the studies varied from project to project. However, given the constraints of time and place, most of the studies carried out in Ethiopia compare favourably with work which has or could have been carried out by the discussants themselves.

Part of a general problem with anthropological data and anthropologists is

probably that planners ask too much. The planners in Ethiopia felt the need for a considerable amount of what they regarded then as anthropological information, but much of that information really fell into the field of economics or political or managerial science. In pastoral areas, anthropologists have generally carried out longer and more detailed field studies than other scientists and as a consequence anthropologists offer, and planners expect from them, information and advice on a very wide range of subjects. In fact, the investigational techniques and training of anthropologists may not really qualify them to say anything very valuable on many of these subjects. For example, everyone talks very loosely about the need for participation by the pastoralists themselves in planning and making decisions on pastoral development. In other contexts (e.g. the establishment of a major new industrial venture), the organization of planning and decision-making would be thought to lie mainly in the field of a management or organizational specialist. What expertise does the current generation of pastoral anthropologists have in this area? Should managerial specialists also be involved in project planning, or can anthropologists carry out these tasks, as well as provide information on age sets?

Planners need information on how people will behave in the future in the face of specific project-related change, both as individual consumers or producers and as participants in social institutions. What planners often want is prediction of behaviour. Do the sort of studies that pastoral anthropologists habitually carry out facilitate or enable such prediction? Errors in economic forecasting in the developed world are notorious in spite of the existence of a vast army of economists and of forecasting models of tremendous complexity. Is it reasonable for planners to demand prediction of behaviour from anthropologists? Some of the determinants of behaviour, such as basic cultural values, can be manipulated by leadership or propaganda. To take British examples, we would look to political commentators, not to anthropologists, to predict the course of trades union wage demands or the state of race relations, and they would do this largely on the basis of their knowledge of individual leaders' plans and personalities. How much and what can anthropological models predict?

Anthropologists have been of greatest help to pastoral planners in explaining why individual pastoralists and households manage their livestock and use land in

the way that they do. On the basis of these explanations, the behaviour of individuals or households in pastoral societies should not be any less predictable or intelligible than the behaviour of cultivating or urban households. Where observed behaviour differs from what we expect or understand the reason need not be sought in irrational, non-economic, primitive or cattle-complex values or characteristics, but rather in some fault in our own expectations (model) or in the usual variability of individual behaviour from group norms. Anthropologists seem to explain much less adequately or successfully the institutions, social relations or customs of pastoralists above the level of the household. Most of those involved in pastoral development believe the most serious problem of the pastoral areas is the contradiction between the individual ownership and control over livestock and the common ownership but lack of control over land and grazing. Why is it that pastoralists, who at the level of the individual have adapted their behaviour so well to the environment, have not done so, as other societies have, at the level of group action and social institutions? A second puzzle concerns the achievements of pastoral anthropologists, who have been so successful at explaining behaviour in fields of study usually associated with other disciplines but, it would seem, so unsuccessful in the field that is thought of as pre-eminently theirs.

3. ADMINISTRATORS: A NEGLECTED FACTOR IN PASTORAL DEVELOPMENT

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Pastoral development in East Africa has been beset with many problems. Analysis of these problems has tended to concentrate on ecological, social, economic, political and rather general administrative aspects. The theme of this article is that, in addition, administrators themselves are an important but neglected factor; that they must be studied and understood as part of the system when trying to find solutions to problems of pastoral development; and that to realize the potential of administrators more fully requires a combination of research, consultancy, and training.

'Administrators' here means field government staff who work in pastoral areas. They may be at regional, provincial, district or sub-district levels. The term includes generalist administrators and veterinary, animal husbandry, game, forestry and other departmental staff. Typically, they do not originate from the pastoral area in which they are working. 'Pastoral development' means change in pastoral areas which variously combines and reconciles (a) sustainable productivity, (b) considerations of equity and (c) what pastoralists want.

THE NEGLECT OF ADMINISTRATORS

Almost any conceivable form of pastoral development, and certainly all those contemplated in East Africa, requires administrative action. Many of the components of a project or programme rely upon administration: whether surveys, planning, the provision of physical infrastructure, consultations with pastoralists, disease control, grazing rotation, stock limitation, marketing or the provision of social services. Administrative action has many aspects, including organization,

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management and politics, but here attention is focused on the administrators themselves. They powerfully influence the nature of the official interventions which so frequently fail or lead to unintended results, and it is they who implement or fail to implement programmes and policies. When things go wrong, administrators blame pastoralists for being ignorant and stupid; social scientists hasten to explain how the behaviour of pastoralists is rational, an able adaptation to a hostile environment. Social scientists then transfer the blame, in private conversation if not in public discussion or writing, to the administrators themselves, finding their behaviour ignorant and stupid in turn. That the behaviour of the administrators may also be rational - an able adaptation to a different sort of hostile environment - is not usually investigated. To the extent that this is so, one may ask whether it is not the social scientists themselves who are at fault. For administrators are also human and a significant part of the development system; for the future, any effective systems approach to the planning, implementation or monitoring of pastoral development must surely include them as a key factor.

It is, then, striking that there is little comparative knowledge about administrators in pastoral areas. Although administrators must be considered part of the human ecology of pastoralism, it is understandable that natural scientists should neglect them. What is more surprising is that social scientists have paid them so little attention.¹ It has been very much the exception, not the rule, to include them in social science studies. Reining (1966:xvi) in his work on the Zande Scheme in Sudan felt he was breaking new ground as a social anthropologist in the extent to which he was forced to take account of the influence of administrators, writing that:

This study is unique in the degree to which it attempts to specify the influence of non-Africans in the modern African scene. I do not undertake to study British culture as such, but merely to account for changes in Zande society that have originated with the British administrators Since some important changes have arisen almost entirely from the culture of the European administrators, with little modification from Zande culture, the administrators had to be included in the society under study.

¹ But see Baker (1974: 3-10) for administrators' and planners' perceptions; Monod on 'Le Nomade et le commissaire' in Monod (1975: 55-60); Spencer (1973: 168-198) for a chapter on "The Samburu and Rendille under British administration"; and Welch (1969). With the partial exception of Welch's work, apparently no study has yet been made of the life, work and problems of administrators in pastoral environments.

But usually those outsiders, mainly social anthropologists, who have been closest to pastoralists and understood them best, have not been inclined to include administrators in their studies, have treated them as an exogenous variable, and have concentrated their attention almost exclusively on the pastoralists themselves.

Several explanations can be advanced for this neglect of administrators by social anthropologists. In the first place, there is a personal and diplomatic dimension. Social anthropologists work in particular areas or districts. Anything they write about administrators is liable to be linked with particular individuals. (Reining's extraordinary frankness about 'the second District Commissioner' may have been permitted only by the end of the colonial regime and the lapse of a decade between his field work and his book). A frank and detailed analysis might be rash and even subject to litigation. Moreover, to the extent that social anthropologists depend on the goodwill of administrators, they will not wish to offend them either individually or collectively, and their reluctance to criticize may be the stronger to the extent that they develop friendships with them. A second explanation may be quite simply that field work is exacting and generates so much information and so many questions that social anthropologists have neither time, energy nor inclination to expand their studies to include administrators. A third, and perhaps most persuasive, explanation is that the administrative system is not part of the traditional concerns of ethnographic studies. It may be considered the legitimate study not of social anthropology but of public administration and political science.

But students of public administration and political science have also tended to ignore administrators in pastoral areas. There have been studies of rural administration, for example in Hyden et al (1970) and Leonard (1973), and many of agricultural extension. But only one, apparently, deals specifically with administrators in a pastoral area, and this - Welch's thesis on pastoralists and administrators in Karamoja (1969) - is unpublished.

Again, reasons for this lack of research are not difficult to find. Pastoral areas are often remote and inaccessible. Administrators there are more difficult to study than administrators in settled agricultural areas. The great majority of students may also prefer to work in settled agricultural areas because these are the areas from which they originate and with which they feel familiar. Social scientists,

especially students, tend prudently to study what is studiable and physically less exacting. In these circumstances, it is perhaps not surprising that so little of relevance has been written.

Given the factors which deter social scientists from studying and writing about administrators, there is a danger of repeatedly aiming research at lower-priority targets. Professionals are tempted to cross the t's and dot the i's of existing paradigms and concerns, while leaving expanses of ignorance untouched. Rigby (n.d.: 51) is by no means unusual in having called for more sociological research without specifying that it should be directly related to the political and planning problems which he identifies. In his paper on 'Pastoralism and prejudice', he has written:

If livestock development is to become a major tool in rural development, much more sociological research of an intensive kind would pay handsome dividends. I have suggested that there are, however, deep-seated political and planning problems involved. Some of these problems are a legacy we have inherited from the colonial regimes. But others stem from unformalized but persistent prejudice, particularly at local administrative and 'popular' levels, against pastoral and semi-pastoral peoples. This suggests that the planning and administrative hierarchies are insufficiently coordinated to translate enlightened attitudes and policies on pastoral development into action at the local level.

This is, of course, only one paragraph from a long paper. But it does illustrate the tendency. Sociological research implies research on the pastoralists, not on the administrators. But pastoralists in eastern Africa are relatively well understood by social scientists. The main problem is to see how to make the insights of social scientists accessible to administrators and how, appropriately, to influence their attitudes and behaviour. For that, an understanding of administrators themselves is needed, and it is towards them that research should be directed.

As long as we remain largely ignorant of administrators and their environments, there are two dangers. The first is the ease of thinking of them in terms of uncomplimentary stereotypes - as ignorant, arrogant and arbitrary in their actions. It must be admitted that in both the colonial and the post-colonial periods the actions and attitudes of administrators have quite often seemed to justify those epithets. Examples can be found in the long list of failures in pastoral management and failures to learn from failures; in the recurrent reflex to compel pastoralists

to settle and grow crops, regardless of whether this would be sound land use, whether crops would grow or whether people would want to settle; in alternations between indifference and laissez-faire policies on the one hand and the resort to force and compulsion on the other; in the continuing practice of putting in more water sources without measures to sustain the productivity of the range made accessible by that water; in what sometimes appears a perverse refusal to grasp the rationality of nomadism. I have myself as an administrator been guilty of some of these errors and now, looking back, am staggered at my blindness and at a loss to understand how I could have been so deluded. The puzzle and the challenge here are to try to understand why administrators behave as they do, and why they believe what they believe. Administrators may indeed, in their ignorance, be prejudiced about pastoralists, but so too may social scientists, in their ignorance, be prejudiced about administrators. The stereotypes of administrators may be built up and reinforced not by research, but by anecdotes selected because they make good stories, quoting the quotable, as is done, be it noted, in this paper. There is, however, no *a priori* reason to suppose that administrators' behaviour is any less rational, given their environments, than is pastoralists', given theirs. Only when knowledge of that rationality replaces prejudice will it be possible to see how they, the administrators, can be influenced to behave differently.

The second danger is that we will continue to ignore the administrative factor in planning for pastoral development. Howell (1977:106), writing about western Sudan, has argued the need for an 'administrative resource survey' as part of the planning process. He asks:

What institutions for implementation exist at local level? What is the 'carrying capacity' of the local administration? How far can the structure of central, provincial, district and local council administration enhance the prospects for detailed development planning? How are planning decisions taken? What is the existing strength of professional field staffs? It is only after answers to these questions have been attempted that the development plan itself can be appraised and an institutional strategy for implementation be considered. It is not enough to conjure up some ideas on implementation simply as an afterthought to the recommendations based on an integrated resource survey. The administrative 'mapping' must be part of the development plan itself.

An administrative resource survey in pastoral areas might frequently reveal systematic problems which would limit and condition what could be attempted; in

the absence of such a survey, proposals drawn up are likely to be unrealistic.

FACTORS AFFECTING ADMINISTRATORS

From the limited information available, scattered evidence and impressions can be drawn together to suggest four clusters of factors which especially affect the motivation, behaviour and perceptions of administrators. These four areas also constitute a partial agenda for future research. They are:

- transfers and continuity
- difficult and unpopular postings
- administrative convenience
- encapsulation and belief systems.

Transfers and continuity

To the extent that pastoral development requires confidence and mutual understanding between pastoralists and administrators, continuity of contact is an important element of success. Such continuity may be all the more important when the pastoralists distrust the administrators and the administrators misperceive or misunderstand the pastoralists. Of late colonial grazing schemes in Kenya, Hennings (1961 : 68) wrote that if there was little prospect of staff continuity over, say the first 5 years, it was probably better not to start at all, and that the surest key to success in the early stages at least was to have the right officer actually living in the area. This is borne out by experience in Kenya in the late 1950s and early 1960s: grazing schemes enjoyed apparent success in West Pokot District with the same officer in charge for the better part of a decade, but fared worse elsewhere where there were more frequent staff changes.

There was probably greater continuity in field posts during the late colonial period than there has been since. The period of Africanization was inevitably a time of very rapid transfers which have since moderated but probably stabilized at a higher rate of turnover than before. The evidence is scattered but consistent. For Southern Darfur Province in Sudan, Howell (1977:177) reports 'a record of high staff turnover'. For the Taita and Kaputiei Schemes in Kenya, Simpson (1973:15) observes that 'a very heavy responsibility falls on the Range Management Division's

local range officers They are . . . liable to be transferred from one part of Kenya to another and their period of service in any one location is often less than a year'. At a District Development Committee meeting held in Kenya's Samburu District in 1977, which had before it as the major item on the agenda a land-use plan for part of the district, only 1 of the 10 or so government officers present had been in the district for more than a year. Indeed, Moris (1977:79), having worked for some years in a pastoral area of Tanzania, has suggested that frequent transfers may now be systematic in East African administrations. He has put forward the view that this frequency is linked with a lack of effective control options for top officials who use the transfer of subordinates as 'the main administrative solution to almost every problem'. If this is so, then there may be only very temporary and superficial contact between what are often two systems of nomadism - that of the pastoralist and that of the administrator - with neither seriously interested in understanding the other, but merely trying to capitalize on what both recognize as a transient relationship. Such a situation severely limits the types of initiative which can be contemplated in pastoral development.

Difficult and unpopular postings

In both colonial and post-colonial East Africa, administrators have usually come from cultural backgrounds alien to those of the pastoralists themselves. The three main groups of administrators are expatriate colonial administrators, expatriate technical assistance personnel and, now most importantly, African administrators from a non-pastoral background.

Expatriate colonial administrators were, of the three groups, probably the most satisfied with their posting and the life it entailed. Most of these administrators in eastern Africa were people who had chosen to live and work away from their home countries and who expected and were prepared for unfamiliar experiences. Those who worked in pastoral areas were partly self-selected because they preferred the sort of life entailed. Some, like Chenevix-Trench (1964), revelled in the opportunity for a physically exacting, unconventional and hard life in remote areas. Many, perhaps most, of the colonial administrators who worked in pastoral districts did so in preference to work in settled agricultural districts.

With technical assistance personnel and volunteers, the pattern is by no means so clear. Quite often, it seems, they have been unprepared or unsuitable, though the evidence is scattered, incomplete and anecdotal. A strange and perhaps extreme example is presented by the American Peace Corps volunteers who worked in range management in Kenya, of whom Simpson (1973:16) has written:

The Peace Corps consists of young men newly graduated, usually with neither ranching nor African experience. These unfortunate people were sent into the wilds of Taita and Kaputiei after a brief initiation course to camp under canvas in the locations where ranches are planned. They were supposed to organize the local people and then become the managers of the ranches when they started. One cannot but be sorry for them; camping in a strange environment, often sick from insect bites, food and water infections, surrounded by wild animals and snakes, with curious Africans watching them yet unable to communicate with these other human beings owing to their ignorance of the local languages. It is not surprising that some of these young men left, not being able to stand the conditions. It is remarkable that one or two made a success of their mission.

In general, technical assistance personnel and volunteers probably experienced more severe shocks and found their postings and work more difficult than had expatriate colonial administrators who had a longer acclimatization and more clearly defined roles.

By far the most important group of administrators in pastoral areas, however, consists of African administrators who come from a non-pastoral background. Partly because of relatively low educational standards among pastoral peoples, most African administrators are probably not from pastoral, but from settled agricultural backgrounds. For them, it seems, postings to remote pastoral areas are usually unpopular. The reasons include:

- the use of such postings to punish those who have in some way misbehaved or fallen from favour, or those who are politically weak and least able to resist, a strategy which also occurred in the colonial period
- the distance from the capital where transfers and promotions are decided
- difficulties with children's education and often the need to leave children in school elsewhere in the country, with consequent family disruption and cost
- physical hardship factors such as climate and diet
- distaste for extensive travel and camping out
- social isolation in what is perceived as an alien culture
- lack of urban amenities
- inadequate transport.

One consequence may be that administrators spend much of their time on activities unrelated to pastoral development. They may make frequent and prolonged visits on various pretexts to regional headquarters and to capital cities, both for social reasons and in order to campaign for a more congenial posting. A high proportion of their transport budgets may be spent on these trips, curtailing their travel in their districts. In the pastoral area itself, they may devote a great deal of effort and imagination to improving their own conditions. As Welch (1969:218-9) has pointed out in his description of the District Team in Karamoja in 1968, they may form a pressure group. His example may be extreme, but it does give the flavour of administrators' concerns in somewhat isolated posts. The District Team, he says, was 'wholly a creature of the local representatives of the various Ministries of the Central Government'. He goes on:

In March, the Team devoted a large portion of its meetings to 'allowances in relation to costs in Karamoja'. Topics under consideration at that time were the price of *matoke*, the poor quality of fresh milk, the high price of petrol in Moroto, the inadequacy of the 'up country' living allowance, the absence of 'price control' in the District with the resultant effect being (in the eyes of the Team) that 'the Civil Servant in Karamoja was the Victim' (capitalization in the original)... In October of 1968, a discussion was centered around a TV station for Moroto. The Team felt that 'in view of the fact that the number of TV owners in Moroto had increased tremendously' a TV station should be built in Moroto, or failing that, 'a TV repairman should visit Moroto as often as possible'.

This over-concern with creature comforts of the Civil Service shown by the District Team, while being understandable, is nonetheless indicative of the Team's total unawareness of the major problems of the District. Indeed, ... the Team was willing to close the only agricultural training establishment in the entire District if it meant by so doing that they could get fresh milk delivered in Moroto....

The importance of this example is not that it indicates a general condition, at least in an extreme form, but that it contributes to an agenda for research. If African administrators from non-pastoral backgrounds dislike their postings, this is liable to influence their attitudes and behaviour. Only by understanding their problems and motivations, and the rationality of their behaviour given their environments, will it be possible to identify realistic measures for improvement.

Administrative convenience

Administrators' behaviour is partly determined by convenience. Their tasks, of course, vary by department and by district. There is, however, a recurrent tension between what is convenient to the administrator and what is convenient to the pastoralist. Administrators like fixed locations. They often concentrate their attention on site-bound activities - constructing schools, health centres, dams, boreholes, government offices, roads, crushes and the like. These are conveniently stationary and, being physical, they are visible and even photogenic, and can be shown to visitors as evidence of progress. They are also, of course, often badly needed. But this preference for the physically fixed carries over into prescriptions for the human and animal population. The persistent view that pastoralists should be made to settle in one place may reflect not only a cultural preference for settled agriculture but also a desire for administrative convenience. Those who are settled are more easily regulated, taxed, protected and even fed in times of famine. But those who settle in small centres may be atypical: the very rich, who can afford to abandon nomadism, and the very poor, who cannot afford to continue it. The great majority of the population may continue its nomadic way of life under pressure from the imperatives of a marginal environment, and remain inconveniently out of touch for site-bound administrators. Convenience keeps administrators and pastoralists apart.

Encapsulation and belief systems

Administrators who are alien to a pastoral environment may be especially vulnerable to encapsulation and to belief systems composed largely of myths. The encapsulation is both physical and cognitive. Physically, they may be almost entirely confined to their houses, offices and vehicles, with little or no direct exposure to the world of the pastoralists. Cognitively, they may seek out, be exposed to and be presented with highly selective information. In particular, all or almost all those with whom they come into contact will have special reasons for presenting slanted or selected information and impressions. Those government staff who originate from the local pastoral population are often caught in an awkward intercalary position - 'the nut in the nutcracker' (Welch, 1969:200) - between administrators on the one hand and pastoralists on the other. They may try to sustain their position by

presenting to the administrators information which provides evidence for what the administrators want to believe. The administrators themselves may have what Dahl and Hjort call an 'anti-nomad ideology' (1976:18) supported by misconceptions about pastoralists. The outcome can be the coexistence of two belief systems about the same reality: that of the administrators and that of the pastoralists themselves. This appears to have been true in the colonial period as well as today. Thus of the earlier period, Spencer (1973:174) found 'two sets of values with little in common (save mutual goodwill on both sides) and two worlds of reality coexisting in one district'. Of more recent situations, Baker (n.d.:360) has similarly observed that:

there exist two separate worlds, those of the planner and the planned; divided by a gulf of perception. The failure to bridge this gulf is a major contributory factor to the deplorable state of Africa's rangeland at the present time as well as to the distressing *impasse* which exists between stock keeper and administrator, planner or visiting expert

In making generalizations such as these, there are also dangers. It has to be asked whether perceptions are selective, whether anecdotes are collected and remembered which show administrators in a poor light, whether failures receive more attention than successes, and whether pastoral development is not inherently so difficult that there is a persistent tendency to place the blame for shortcomings on administrators who are in a situation of widespread ignorance even on the part of the experts, attempting what is virtually impossible. But administrators may be behaving rationally, and they need their belief systems, just as, in their different ways, pastoralists are behaving rationally and need theirs; and administrators, like the pastoralists and pastoral situations with which they deal, are not all the same. Though the general impression may be depressing, particular cases may be more encouraging.

A DIRECTION FOR SOLUTIONS

The solutions sought depend on the problems identified, while the problems identified depend, in turn, upon the discipline and viewpoint of the observer. The multi-faceted nature of pastoral situations and pastoral development needs no emphasis. But the tentative assertions above suggest is that, in the sphere

of planning and implementation, something more may be needed than conventional prescriptions. It is a start to identify, as Baker (1975b) has done, that there is an administrative trap: that different departments handle different sectors, and that the social aims and norms of the pastoralists are neglected because no department is competent to deal with them. But one has to ask who is to assess and represent within the planning bureaucracy those social aims and norms, and how it can be made possible and rational for them to do so. Those most suitable may well be the generalist administrators who, in departmental debate, use as a trump card their opinions about what is politically feasible, and what the people will accept or can be persuaded to do. This, then, leads back to the perceptions and behaviour of those generalist administrators, and the four adverse conditions which affect them - lack of continuity, difficult and unpopular postings, administrative convenience, and encapsulation and misleading beliefs. The most effective solution to these four problem areas may lie, as with much management development, in a combination of research, consultancy and training.

Research appears necessary in order more systematically and fully to understand the life, work, perceptions and beliefs of administrators. It is particularly needed because administrators who work with pastoralists appear to have been less studied and less understood than those who work in areas of settled agriculture, and because social scientists' views of such administrators, starting from the effects of their actions on pastoralists, have tended to be unsympathetic. For reasons which parallel those for the persistence of technical assistance and for the unpopularity among national administrators of work in pastoral areas, almost all the research on pastoral systems that has been written up has so far been by non-nationals, as reflected in the references to this paper. In addition to other powerful reasons for future research by nationals, the study of administrators may be an area where they have a strong comparative advantage over non-nationals in ease and accuracy of understanding and interpretation.

Consultancy appears necessary because some of the problems are systemic. If frequent transfers and unpopular postings are a serious and endemic problem, then management consultancy within or for the government concerned will be needed, together with progressive administrative changes, if the problems are to be reduced or overcome. Questions of selection and induction of suitable staff may emerge as critical.

Training appears necessary because of administrators' misperceptions of pastoralism and pastoralists and because of the wrong prescriptions which flow from them. The assumption here is that better understanding on the part of administrators would improve their actions and make pastoral development at least less unlikely.

These three approaches are mutually supporting: together, they are greater than the sum of their parts. Any organization undertaking them, however, has to be versatile and credible. It may be that such an undertaking would be difficult in most countries for any national organization on its own. In Kenya, Tanzania and Uganda, for example, predominantly pastoral districts are a minority and might not justify using national resources to mount a special programme. Perhaps the International Livestock Centre for Africa could develop such a capability for research and consultancy and conduct training, partly through national institutes of administration or agricultural training organizations. The tasks are intimidating and the risks high. But if the argument of this paper is correct, many of the problems in pastoral development lie in the administrators themselves and in the administrative environment in which they operate and unless these problems are understood and overcome the prospects for pastoral development in much of eastern Africa may well remain limited.

4. THE ADMINISTRATIVE TRAP

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During the 1968-74 drought in the Sahel, several lines of argument were propounded on the possible causes of the disaster. Briefly, these were the climatic change argument, which maintains that the world is passing through a period of short- and long-term climatic cycles related to major changes in the general atmospheric circulation; the environmental mismanagement argument which lays the blame on gross overstocking leading to degradation of the rangelands, so that droughts, when they inevitably occur, act upon areas of diminished resilience; and the feedback argument, which combines the other two approaches and maintains that local changes in climatic conditions are strongly influenced by man's misuse of the land. Clearly, some elements of these arguments would require prolonged investigation to substantiate. Although such work is in progress, it will, of necessity, be some years before the details of climatic change are documented. However, there are some elements in the degradation equation which appear to be well proven and about which something can be done quickly. Unfortunately, the solutions lie in the field of politics, and remedies in that quarter cannot be transferred with the ease of technology; they require an awareness of the nature of the problem on the part of the administrations concerned. In addition, an initiative may well be required which goes against personal power or authority as well as other notoriously implacable forces.

The intention of this paper is to illustrate how the structure of most administrations in the drought-afflicted countries of Africa may have contributed to the recent hardships and may, even now, be paving the way for a worse situation to come. This is not sensationalism or political axe-grinding; it is not an argument for Marxist versus neo-classical thinking. It is, instead, merely an observation that the structure of government inherited from the colonial era is often inadequate for dealing with ecological problems and has, in many cases, been superceded by

new structures in the former colonial powers themselves. The crux of the argument is that a division of administrative responsibility into sectoral compartments means that the administration is neither able to perceive the nature of an ecological problem, nor to do anything meaningful about it. This structure, in turn, influences the type of assistance that countries seek, and, since aid is not provided unless specifically requested, the type of assistance that these countries receive. So, the administrative trap has far-reaching repercussions and, because of its essentially political nature, will be very difficult to remedy.

As mentioned earlier there are two stages to a remedy: drawing the government's attention to the nature of the shortcoming and then waiting for the government to take an initiative in the direction of administrative change. The first part of the remedy is an area in which outsiders can help by using their experience and observations of the country concerned and of parallel situations elsewhere to make the government aware of the problem it is facing. In this field, there has been an effort recently as part of the International Cooperative Programme for the Ecological Management of Arid and Semi-Arid Rangelands in Africa and the Middle East (EMASAR), initiated by the Food and Agriculture Organization (FAO) and the United Nations Environment Programme (UNEP). An expert consultative panel which met in May 1974 and an international conference which took place in February 1975 (FAO, 1974 and 1975) discussed the need for administrative change. In respect of the second part of administrative reform, the implementation stage, guidelines are being laid down which are designed to assist without interfering directly in the thorny field of political initiatives at the national level.

At its 1975 meeting in Rome, the EMASAR group noted that 'accelerated deterioration evident in recent years cannot be attributed solely, or even largely, to drought; that in many areas, human and livestock populations have for some time exceeded the carrying capacity of the land', and 'that the majority of development efforts to date have not been very successful'. In fact, far from being successful, many projects for the development of rangeland areas in tropical Africa have been positively harmful. One delegate (Konate in FAO, 1975) went so far as to remark: 'Proper range management prior to and during the drought could have reduced or even prevented this catastrophe'. This may be something of an exaggeration

but the failure of rangeland planning and the more serious failure to control the growing imbalance of human and livestock populations with the rangeland find their roots largely in the hiatus between administrative structure and an ecological problem of grand proportions. Commenting on the failure of past projects, the 1974 FAO consultative panel identified the four following contributory factors:

- the absence of a clear national commitment or strategy for range development
- the lack of information or understanding concerning ecological potentials and constraints and socio-economic conditions
- the lack of an adequate organization in the national government for the planning, direction and coordination of range development programmes and
- the inadequate local participation at the pastoral community level and insufficient attention to the problems of security of land tenure and protection from encroachment by outsiders.

The administrative trap, as described here, plays a substantial part in either creating or accentuating these weaknesses in planning.

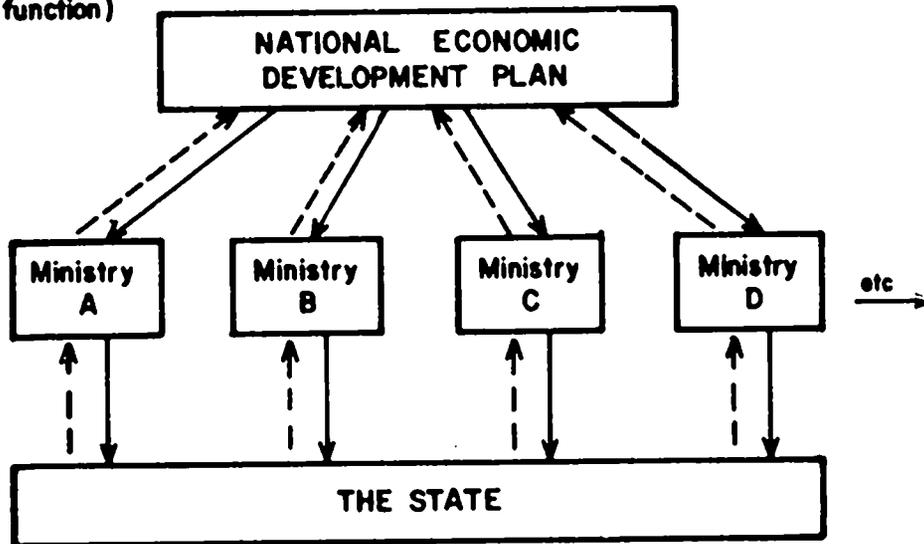
Briefly, the administrative trap refers to the way the structure of an administration largely determines its capacity to recognize and deal with interdisciplinary problems, however devoted or talented its staff. Most governments in Africa have a conventional sectoral structure in which various ministries or departments are given functional, as opposed to geographic, responsibilities. The activities of a ministry are governed by its allocations in the national plan or disbursements from the treasury, the terms of reference of other ministries and, to some extent, the attitudes of the person or persons in charge. The weaknesses of this common type of administrative structure will be examined in a hypothetical example. Figure 1, though not relating to any particular country, will no doubt be familiar to all those who have worked in the rural planning field in the Third World. Since the drought had the most serious effect on the pastoral peoples of the Sahelian region, rangeland management will be examined as the ecological field against which to evaluate the performance of the traditional administrative structure. Any other broad interdisciplinary field would illustrate the case equally well.

In Figure 1, the central problem is rangeland management which, quite simply, means the way in which current land use relates to the long-term quality

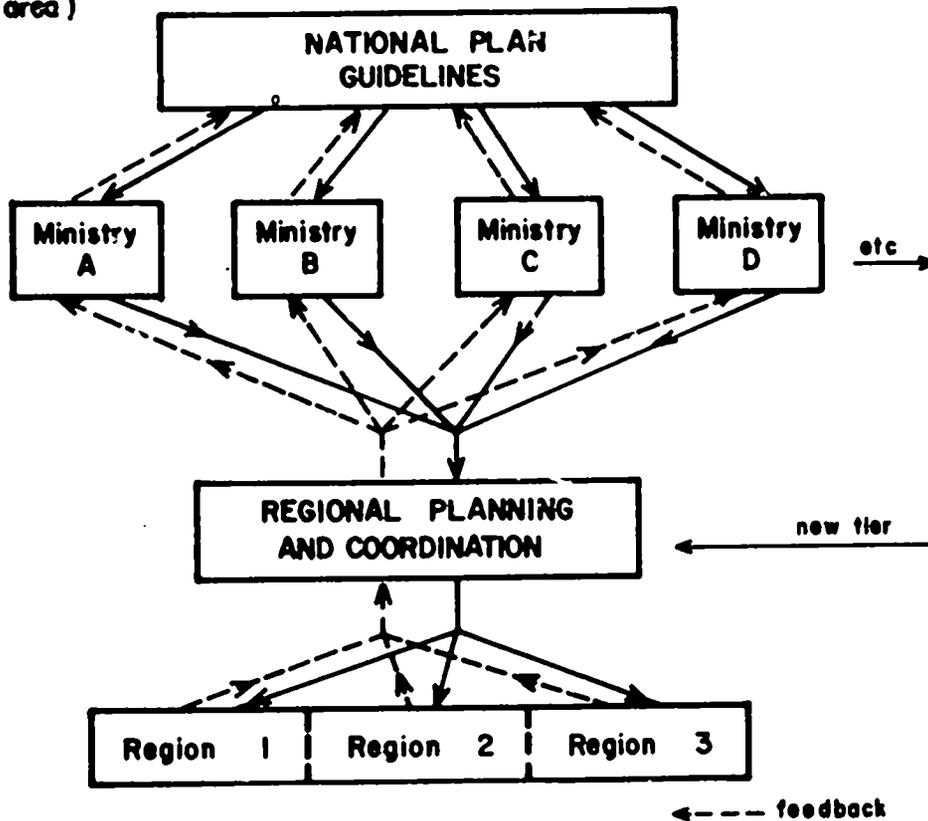
Figure 1

A SECTORAL APPROACH TO PROBLEM SOLVING

Sectoral
(by function)



Regional
(by area)



of the land. However, the relationships involved are extraordinarily complex as, indeed, most ecological relationships are. The boundary of the circle in the figure represents the boundary of the ecological problem of rangeland management. An adequate awareness of the problem or a responsible approach to change must recognize and accommodate all the elements within this circle, i. e. all the component parts of the environmental equation. These components, such as agriculture, veterinary medicine, water development, stock control, marketing, community development and so forth, are all recognized as areas for government intervention. What is regrettable, however, is the way that they are recognized, for, instead of being taken as component parts of several ecological problems, they are taken as ends in themselves by the Ministries of Agriculture, Livestock Production, Water Development and so on. Each ministry deals only with the elements defined by its terms of reference and tends to regard these symptoms of the general problem as ends in themselves (identified as stage 1 in Figure 1). No one is concerned with how one symptom relates to the overall problem of range management except perhaps a Range Management Department in the Ministry of Agriculture or Livestock Production, which is itself restrained by the terms of reference of its own ministry and its inability to influence or effect changes in all but veterinary, grazing and, possibly, marketing fields.

This is, then, a problem of communication: all too often the relationship between various ministries is characterized by poor communication or, at worst, out-and-out rivalry. Thus, problem identification never goes beyond the level of dealing with particular symptoms. On previous attempts to bring the contributory elements of rangeland planning under one roof within the sectoral structure, the FAO consultative panel (1974) comments: 'Clearly, an executive or a planning unit hidden in the side office of a livestock division of an agricultural department of a rural development ministry does not have much of a chance of success'. An action programme (stage 2 in Figure 1) based on one ministry's perception of the problem will, inevitably, lead no further than to the treatment of symptoms.

This fragmentation has played a large part in poor planning in rangeland areas. It encourages:

- palliative measures conceived without sufficient consideration of related factors, i. e. remedies in one area which are likely to cause an imbalance

- elsewhere, as when water is provided without clear proposals regarding grazing control and increased offtake
- measures which take into account only significant relationships within one sector, e.g. how a change in livestock health in one area is likely to influence the same factor elsewhere
 - measures based on a view of the country in terms of functional disaggregation rather than, perhaps, spatial groups of sectoral symptoms forming a problem region. Thus, the Ministry of Agriculture looks at agriculture all over the country, rather than considering how agriculture in one area relates to the communications, marketing, social and other inter-dependent factors in the same area. At present this is a reasonable approach, as the Ministry of Agriculture cannot do anything about other problems anyway.

In consequence, many projects designed to cure symptoms have the now familiar effect of worsening the overall problem. Once an imbalance occurs, only a programme aimed at the cause of the imbalance can produce an improvement: patching up the effect of the imbalance is ignoring the problem completely and probably making it worse. This, in summary, is the history of rangeland planning in most parts of semi-arid Africa.

So far only the domestic side of the administrative trap has been considered, but there is an equally serious international dimension. Most aid or technical assistance comes in response to specific requests from the recipient country. It follows that, in most cases, what is provided relates fairly closely to what is asked for and, in turn, what is asked for relates to what is considered to be the problem. Thus, a request for assistance (stage 4 in Figure 1) will contain within its terms of reference or contractual stipulations guidelines as to what is required, usually by a specific ministry or department. The response to the request will, naturally, follow the terms laid down by the client (stage 5 in Figure 1), though occasionally shortcomings may be pointed out. If this happens, the results of such an observation are likely to be limited if they are of an ecological nature, because the client ministry simply has no power to change the situation as a whole. It cannot, for instance, investigate the work of other ministries. So, international donors are sorely tempted to tell their clients what they want to hear. This is not suggesting

that the advice they offer is poor, just that it generally does not deal with ecological problems as a whole.

Once an assistance project is under way, there is little opportunity for an outside worker to recognize its inappropriateness, because of his limited time schedule (stage 6 in Figure 1), his own narrow technical specialization in most cases and a general reluctance to criticize his terms of reference. And so the vicious circle is completed. This discussion suggests that care should be taken when apportioning blame for what has gone on in the past. Clearly, much of what has been done, for instance in the Sahel, has contributed to present problems. But this is not an indictment of the technical expertise which was involved: wells were often competently dug and the vaccines which have been produced in the last 20 years have been effective. Yet at the level of interdisciplinarity encompassed by a problem such as range management, the organization is stacked against success from the start. This problem lies at the root of a great deal of failure in technology transfer, since the inappropriateness of an item of technology may well be attributable to a factor totally outside the mechanics of the item concerned, or even the field in which it most directly applies. For instance, a tractor programme may fail because of the land tenure system, the credit infrastructure, the social organization or the lack of vocational training.

One further observation: although most of the component sectors of the range-management problem illustrated in Figure 1 fall under the aegis of one ministry or another, one critical gap remains. The social dimension of the range management equation has been either ignored or subject to the worst form of insupportable generalization. Because of this, many development efforts to date have produced totally unexpected and undesirable responses from the people living in the areas concerned. This is usually not so much a case of bad information as of no information, because no department is specifically charged with the responsibility of finding out why people behave the way they do. So, in Figure 1, the social dimension is shaded as a separate class of symptom, one that is largely neglected. At best, a community development structure may exist in which a sociologist is involved, but once more a communications problem is likely to emerge as the community development service is, itself, part of a ministry and may suffer the same isolation from other ministries as exists elsewhere.

Table 1 illustrates the administrative structures of some countries in tropical Africa in 1975, showing the ministry most closely connected with the planning of semi-arid areas occupied by pastoralists. Countries have been excluded which lack arid or semi-arid pastoral regions. In almost all the countries shown, administrative functions were divided conventionally, with either a Ministry of Agriculture with a Livestock Department or a separate Livestock Ministry. In Uganda, for instance, Animal Industry and Agriculture were two separate ministries which made it difficult to achieve any form of unified policy towards agro-pastoralists such as the Karamojong. This is not to say that development is impossible in a sectorally-divided administrative system, since many of the now-developed countries still retain this structure. However, many of the developed countries have come to appreciate the price of splitting problems in this way, as threats of pollution or unbearable social costs arise. In Great Britain, such an awareness lay partially behind the creation of the Department of the Environment.

At first glance, the structure of administrations in the Sahelian countries appears encouraging: in place of the usual agriculture/veterinary split, Mauritania and Senegal have Ministries of Rural Development, Mali has a Ministry for Production, and Niger has a Ministry of Saharan and Nomadic Affairs.¹ However, some of these countries have sectoral ministries as well, so the effectiveness of the broader ministries depends on how far they are able to coordinate or influence the work of the others.

To address effectively the problems of range management, therefore, requires a structure with sufficient authority to achieve coordination. It is difficult to see how any Range Management Department, unless it is housed directly in the President's or Prime Minister's office, can possibly wield this kind of authority. For this reason, regional planning may be the only feasible solution.

Figure 2 contrasts the approach of conventional sectoral planning with that of regional planning. In the first section, we see what has been described as 'the wonderland of no dimensions', or conventional economic development planning.

¹ This discussion is based largely on the names of the ministries, rather than a detailed knowledge of how they function.

Table 1

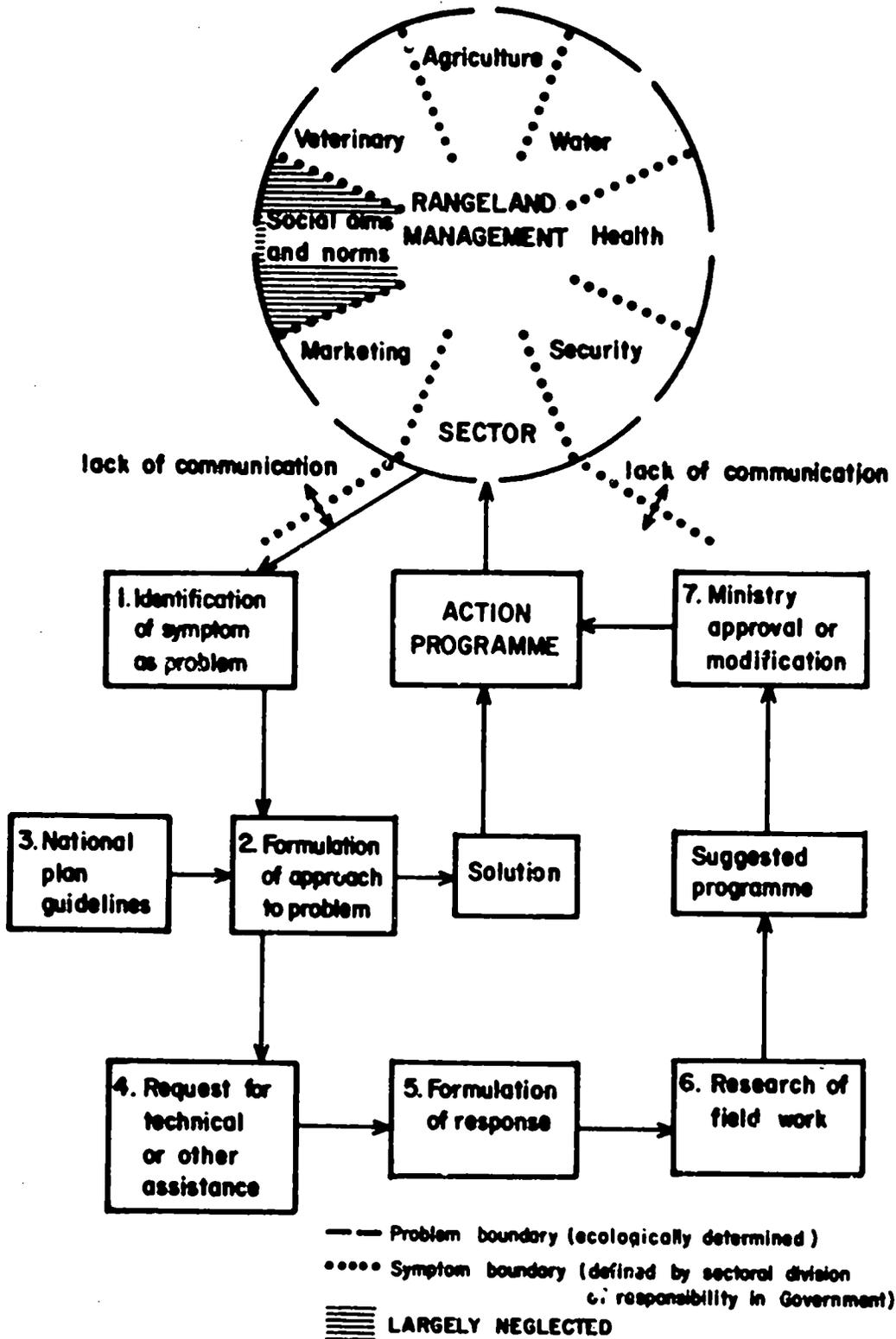
**MINISTERIAL RESPONSIBILITY FOR RANGELAND DEVELOPMENT IN
AFRICAN COUNTRIES (1975)**

Country	Ministry Most Closely Involved in Range Management
Botswana	Ministry of Agriculture
Chad	Ministry of Agriculture and Stockbreeding
Ethiopia	Ministry of Agriculture
Guinea	Ministers for Local Development for Regions, Ministers of Rural Development
Kenya	Ministry of Agriculture
Madagascar	Ministry of Territorial Planning, Ministry of Rural Development
Mali	Ministry of Production
Mauritania	Ministry of Rural Development
Niger	Ministry of Saharan and Nomadic Affairs
Rwanda	Ministry of Agriculture and Livestock
Senegal	Ministry of Rural Development
Somalia	Ministry of Rural Development and Livestock
Sudan	Ministry of Agriculture
Uganda	Ministry of Animal Industry
Upper Volta	Ministry of Agriculture, Cattle Breeding, Rivers, Forests and Tourism

Source: *Europa Year Book* (1975).

Certain basic policy guidelines come down in the form of a Five (or other) Year Plan. Individual ministries then act on these guidelines, which are of the broadest nature, such as, 'increase GNP by x%', or, 'increase employment by x%', by formulating their own policies and programmes in the style illustrated in Figure 1. Feedback is directed to the individual ministries, so sectoral planning becomes a closed system. The second part of Figure 2 illustrates the regional planning approach. A new tier has been introduced in the planning process which gives it a spatial dimension. Once more, the basic national guidelines come down to the ministries in the form of a plan, but now their policies cannot be translated directly into action on a sectoral basis across the nation because they are first channeled through a regional-planning coordination process. This process has been depicted in the figure between the

Figure 2
SECTORAL VERSUS REGIONAL PLANNING



ministries and the regions, partly because this is the easier form of regional planning to introduce since the ministries still feel they retain their autonomy. Ideally, however, the regional planning and coordination structure should come between the national plan and the individual ministries. This would encourage a properly integrated approach to the planning of individual regions rather than an exercise to coordinate separate policies. However, such truly regional planning is likely to be seen by many as a threat to their political power.

In terms of managing semi-arid areas, the advantages of the regional planning approach may be summarized as follows:

- It achieves an integration which is relatively painless for those concerned, as they participate as equal partners. No one ministry pre-empts power in a regional planning structure and so no other ministry should feel threatened. These conditions should be favourable for improved cooperation.
- It recognizes the importance of geographic variations. The blanket approach of much national or sectoral planning can work to the detriment of some areas. For instance, in Uganda where the semi-arid pastoral areas form only a small part of what is, otherwise, a rich and well-watered agricultural country, national policies are not likely to be suitable for the pastoral region.
- It gives the pastoral areas a better chance of receiving sufficient consideration in the planning process. Since feedback is also on a regional basis, planners should be made aware of specific regional needs and priorities.

In considering the administrative dimensions of the EMASAR programme, the FAO consultative panel (1974:14) commented:

For most situations, the ideal procedure at the national level may be ... to prepare multi-disciplinary regional and/or district plans, committing all relevant departments to agreed action within the plans; and to authorise a Range Department to execute the programme, with strong interdisciplinary functions and ability to employ other departments, individuals or contractors.

Clearly, such an administrative structure could only be set up at the highest level. Thus, the 1975 conference brought together the ministers of the countries concerned in order to encourage this approach.

A few of the countries shown in Table 1 have initiated a regional approach to planning. Both Guinea and Madagascar have territorial ministries; a Minister for Local Government in each region of Guinea and a Ministry of Territorial Planning in Madagascar. Niger has a Ministry of Saharan and Nomadic Affairs and other countries have formulated regional plans, such as Mali with its plan for the Fifth (Mopti) Region. Most countries, however, retain the basic sectoral structure.

Outside Africa, Pakistan has taken the alternative approach of developing a Range Management Committee with substantial authority. This committee has carried out feasibility surveys of many of the range areas and has prepared comprehensive development schemes, having been assured substantial political and financial support by the Prime Minister. This development was spurred in Pakistan by the problem of salination which has laid waste large areas under tube well irrigation.

The general conclusion drawn from the EMASAR meetings was that, having laid down guidelines for ecological management of semi-arid rangelands and suggested organizational changes, FAO should establish an EMASAR programme to assist the countries concerned. The Central Secretariat of EMASAR would gather information on past experience with varying administrative structures. At the national and regional levels, EMASAR teams would 'assist in strengthening range management organisations', and this might result in some international regional planning of rangelands, based perhaps on the Comité Inter-Etats pour la Lutte contre la Sécheresse au Sahel (CILSS) or on regional cooperation in eastern Africa.

The EMASAR initiative is valuable in that it specifically identifies organization and administrative structure as subjects worthy of study and reform. Unfortunately the firm statements in the consultative document (FAO, 1974) are much weaker in the programme (FAO, 1975), but this may reflect the fact that politicians participated in the second meeting. Nevertheless, the fairly strong terms in which the consultative document couched its administrative argument emphasize the importance now attached to this long-neglected dimension.

A programme of international cooperation should develop out of the EMASAR meetings. This would provide assistance and guidance at the local, national and

international levels to encourage the management of rangelands along sound ecological principles. By establishing, encouraging and guiding projects and acting as a link between donors and recipient countries, EMASAR could serve as a valuable complement to the International Livestock Centre for Africa (ILCA). ILCA is concerned with systems research into livestock production in Africa, as well as training and documentation. The results of ILCA's research could form an essential foundation for the EMASAR programme, especially as ILCA has rejected the sectoral approach to research and has brought in the social dimension:

The systems approach is valuable both for identifying development strategies for immediate use (the best, or safest, strategies in the present stage of knowledge) and for selecting areas for research. Its value in research planning lies not so much in identifying problems, which are often self-evident, as in selecting what are likely to be the most profitable approaches to problem solving. This is especially relevant to livestock production in Africa, where improvement in yield or output is as likely to come from social change or from range improvement as it is from genetic change in the animals themselves (*ILCA Prospectus*, 1974).

The interdisciplinary approach is also reflected in UNESCO's Man and Biosphere Programme; but a sound basis for livestock planning in the semi-arid areas will only be achieved if individual governments are willing to take the political initiatives.

ANTHROPOLOGICAL PERSPECTIVES

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5. PASTORALISTS AND THE GHOST OF CAPITALISM

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At a time when the pastoralists of East Africa are presented with the problem of adapting to new pressures and opportunities, it is vital for development planners to appreciate fully the resilience of their traditional responses, and especially the interplay between social and economic factors in their existing ecological adaptation.

Consistently in the anthropological literature on pastoralism in eastern Africa, cattle are linked with social values and aspirations. On cattle are concentrated a man's 'immediate interests and his farthest ambitions. More than anything else they determine his daily action and dominate his attention.' Wealth in cattle is necessary for a man to obtain friends, wives and dependants. (Evans-Pritchard, 1940:40; c.f. Hollis, 1905:288-9; Cunnison, 1966:31-2; Dyson-Hudson, 1963:82, 103; Rigby, 1969:46, 54-5; Gulliver, 1955:196-7; Spencer, 1965:3).

The exchange of women for bridewealth is in a number of ways one of the most critical and also revealing aspects of this. Details of the transaction vary between societies, but a single theme emerges: that pastoralism in East Africa may to all intents and purposes be regarded as a family business and marriage is one aspect of this business. Among the Nuer, for instance, the herd is depleted by a fixed amount with every marriage, and as soon as a man's 'herd is large enough he, or one of his family, marries. The herd is thereby reduced to two or three beasts and the next few years are spent in repairing its losses.' However, the family has invested in a bride and through her in future children. The sons will be herders and, long before they themselves require cattle to marry their

*The author wishes to thank Dr Rodney Clark, Dr Richard Tapper and Mr. Richard Waller who have read this paper and offered valuable comments.

own first wives, the daughters will be married out to bring in more cattle. To pursue the analogy with a family business further, it is as if the family has a fund of capital that is invested alternately in dependants and stock in an exchange that serves to perpetuate and ideally increase the size of the business or company. Thus, rather oddly, the family herd which is such an important Nuer concept may at times be reduced to a bare nucleus and has to be replenished over time. Yet it remains a reality above all in the capacity to restock: the outgoing cattle have been invested and not lost. The perpetuity of the company is also expressed by the concept of patrilineage, and reverence for former ancestors is coupled with the unquestioned power within the family of its head as manager and living representative of the founders of the company whom he will in due course join. 'Ancestors' and 'herd' with which they are so closely associated thus become symbols of continuity, cohesiveness and of the ultimate aims of the company; and the exchange of women for cattle is a necessary part of its development (Evans-Pritchard, 1940:20, 89; 1956:258).

A somewhat similar oscillation has been reported among the Karimojong, but here there is no fixed payment and the scale varies with the size of the bride's family. An ideal marriage into a large and rich family to which the bridegroom can turn for help whenever necessary is therefore also an expensive one, since each new affine would demand a share of the bridewealth, and the larger the family, the greater the expectation. As compared with the Nuer, there is here a shift from an emphasis on the productive capacity of the bride and a standard payment consistent perhaps with the notion that all brides have the same potential fertility, to an emphasis among the Karimojong on the extension of allies formed through the gifts of stock. As with the Nuer, the ultimate aim of the marriage may be to perpetuate the lineage, but the immediate value of an inflated bridewealth is in effect to take out a good insurance policy, and Dyson-Hudson's data on the hazards of the area clearly indicate the desirability of some form of insurance (Dyson-Hudson, 1966:76-80, 84, 247-9).

Among the Gogo, one also has a situation in which the size of a single bridewealth transaction is considerably larger than the average family herd. However, there is an appreciable shift towards a system in which the groom

gathers together the necessary stock from his paternal and maternal kin. This not only entails an oscillation in the sizes of a household herd, but also an oscillation of credit. A suitor has to satisfy a wide range of cognatic kin that he has a claim to marriage at this point. He has to build up goodwill beforehand to establish his creditworthiness, and morally he places himself in debt until such time as they or their sons make similar claims on him. The notion of the family herd being closely identified with the ancestors is as strong among the Gogo as among the Nuer - indeed the ancestors are thought to go out with the grazing cattle each day and to return at night - but in the context of marriage and bridewealth there is a shift towards a network of credit, and towards each man rather than the wider paternal family being responsible for arranging his own marriage. He is a relatively more independent agent and tries to obtain an investment from others as shareholders in his marriage (Rigby, 1969:48-50).

The Maasai-speaking people present another contrast in that the formal bridewealth is only nominal compared with the sizes of their herds. However, over time the cumulative payment is substantial. Among the Samburu, once the marriage is firmly established with the birth of children, the husband is prone to the insatiable requests of his affines for cattle, with the ultimate threat of their power to curse his children. There is no fixed limit to these payments. In this system of exchange of women for cattle, there is in a sense a mortgage on the wife, with the wife-givers stipulating the rate of payment. A husband and his affines are in direct competition for his cattle, and this leads to a general relationship of avoidance and hostility. For the perpetuation of his lineage, a Samburu has to borrow a wife from his 'enemies' rather than cattle from his friends as among the Gogo. In this respect, the Samburu may be classed among those East African societies who claim: 'those whom we marry are those whom we fight' (Mayer, 1950:22; c.f. Winter, 1956:208). There is close collaboration between those who do not intermarry - members of a clan - and a clan in effect is a guild to protect the joint interests of its members from their affines in other clans (Spencer, 1965: Chapter 2).

The Maasai proper have a similar open-ended commitment with marriage, but contrast in other ways. Here there is an extended period of betrothal, and it

is the future wife-givers who may seek credit from the suitor during the years before the wedding has even taken place. A diplomatic relationship is built up over time, with the girl's father increasingly demonstrating his commitment to the match and the suitor establishing his credentials by complying with the father's requests. In some instances where the relationship is exceptionally cordial, the situation may even be reversed with the suitor as the net borrower. Or if the match is somewhat uncertain, then the wise father will not build up too substantial a debt since all the cattle and their increase would have to be repaid in the event of a break in the betrothal or subsequent divorce. Thus the girl's father may find his hands tied with regard to the bestowal of his daughter if he builds up too large a debt: she has been the security for the cattle he has received.

Thus, there are a variety of patterns in which a large payment for the bride has to be found; either cattle come directly from the family's stock, or the capital is raised in some other way, or credit arrangements are negotiated. The scale of marriage payment and the frequency of marriage are adjusted to the availability of stock on the one hand and of brides on the other; even the fixed quota among the Nuer is not sacrosanct. The type of transaction for each group reflects the nature of the marriage alliance itself, but in all these cases wives entail an essential capital outlay, just as daughters are essential assets; and the position of women in these male-dominated societies can only be assessed with this in mind.

In presenting the domestic value of cattle in this vein, I have treated pastoralism very much as a family business, bent on continuity and, as far as possible, growth. The resources of the business are the fertility of its womenfolk, the potentialities of its children, its residual herd, its credit elsewhere, and above all the skill of the family head in managing his stock on a day-by-day basis and in his stock transactions. Concepts, such as 'founding ancestors' even when they are remote, and 'the herd', even when it fluctuates enormously in size, are symbols of the ability of this business to survive and even prosper.

These incomplete sketches could be extended to a wider selection of societies without altering the basic analogy. Admittedly, among the Islamic pastoralists of East and West Africa there is a significant shift in which bridewealth

tends to be relatively smaller and the stock-controlling group more extensive; in other words, larger and more self-contained companies. Marriages may be preferred within the group thereby bonding it together more firmly, as among the Fulani or Baggara; or they may only be allowed with outsiders, forging tenuous links between independent groups, as among the Somali. Yet, while bridewealth in these societies has less economic significance, the ultimate purpose of pastoralism is still the growth of the herd paralleled by marriage and the growth of the lineage; and the day-to-day symbiotic relationship between man and beast is supplemented by this longer-term symbiosis (Hopen, 1958: 26, 47, 79; Stenning, 1959: 42, 102f, 147f; I M Lewis, 1961: 85, 140; Cunnison, 1966: 31f, 90f).

Here, the primary concern is with the non-Islamic cattle-complex of East Africa. A basic dilemma with which these pastoralists have to contend (no less than in other societies) is the need to exist at two levels. In the day-to-day management of his business, a stock-owner requires a certain independence and flexibility; and the more he isolates himself from others the better the pasture for his cattle and the greater his freedom of choice as problems arise. However, he cannot survive completely alone. He needs occasional help and he must also rely heavily on the wider society to spread out the risks involved. Frequently, for instance, a rich man may loan out a substantial portion of his herd on trust to various friends elsewhere to insure against a sudden local disaster and to redistribute food (but not capital) more equitably (e.g. Rigby, 1969:50f; Peristiany, 1939: 150; Spencer, 1973: 37f). Bridewealth was cited above as another form of wider interaction precisely because it concerns more than just the basic need of men for wives. With its variety of credit arrangements, it too can be viewed as a form of herd dispersal with similar advantages.

This need to exist at two levels accounts for a certain contradiction in the literature on pastoralists, who are often portrayed as both compliant *and* individualistic. The Nuer, for instance, must assist kinsmen and yet at other times will risk breaking up their home by fighting these same men; they are 'deeply democratic' and yet find 'any restraint irksome' (Evans-Pritchard, 1940:49, 181, 183). The Maasai are popularly portrayed in a similar vein. The resolution, of course, lies in the context. When a cow is at stake, then the owner becomes involved as

an uncompromising individualist, but when the issue is broader then he is a loyal democrat, supporting his kinsmen, village, clan or even tribe.

It is useful to conceive of a 'tribe' as a bounded entity which has a viability that the family lacks on its own: marriages, migrations, credits and debts tend to be internal to the 'tribe'. Evans-Pritchard has suggested that the existence of relatively self-contained ecological units may account for the varying sizes of tribes among the Nuer, Dyson-Hudson has elaborated on a somewhat similar model for the development of tribes in the Karimojong cluster, and E Marx follows a similar argument for nomadic pastoralists in the Middle East (Evans-Pritchard, 1940: 118; Dyson-Hudson, 1966:258f; E Marx, 1977: 343f). The division of the Maasai into tribes could well have a similar explanation, since typically each section is associated with a specific ecological zone. Not all societies in the area, the Gogo for instance, are neatly bounded tribes in this sense; but by and large this pattern does obtain among most of the pastoralists, and one is led to accept that up to a point 'tribes' have evolved naturally because ecologically they make sense. Any change in this viable relationship between a population and its territory would lead to pressures that could alter the boundaries. A 'tribe' has a viability that the individual family simply does not have. This implies a consensus to coexist, to intermarry, to extend credit, to support, and so on. In this sense, a tribe may be described as a moral community: a group of people with a very strong sense of obligation towards one another that they do not extend to outsiders, and the tribal boundary marks the limit of this obligation (c.f. Evans-Pritchard, 1940: 120f). The families as companies exist in a territory in which a certain company law prevails, and this constrains them to obey the rules on the one hand, and inhibits them from interaction with outsiders who are not bound by this law on the other. To the extent that 'tribes' and boundaries do not exist everywhere, but are replaced by local variation and a certain merging from one group into another, conventions cannot be shared so widely, and for nomads especially this would present new problems.

Bridewealth transactions are perhaps the single most striking example of Evans-Pritchard's notion of material objects as the chain along which social relationships run, a concept which is also implied in the expression 'property

relations'. But why necessarily cattle? None of the societies so far mentioned relies exclusively on cattle. The Nuer and Karimojong rely on cultivation to a considerable extent, and for the Gogo it is the basis of their subsistence. The answer is in part a cultural bias towards cattle, in part the unreliability of crops in these rather dry arid areas, and substantially because of the transient nature of grain as a possession. Rigby has pointed out that among the Gogo surplus grain cannot be stored for more than 3 years (1 year among the Karimojong), whereas wealth can be accumulated in livestock, and the ideal is to trade surplus grain for livestock. (The Fur have a similar ideal, with *no* ideological bias towards cattle as such.) Land is an alternative commodity, and, in areas where it is arable and amenable to cash cropping with the introduction of the plough, land surplus and the cultural bias towards cattle have given way to land shortage and the virtual elimination of cattle, as among the Kipsigis. The areas considered here, however, appear too arid for such a transition: cattle remain the prime source of permanent wealth, and there is no real scarcity of land for sparse subsistence cultivation (Evans-Pritchard, 1940: 77, 80, 89; Rigby, 1969: 22, 44, 54-5; Dyson-Hudson, 1966: 41, 42, 43; Manners, 1962: 493; Haaland, 1972: 154; c.f. Peristiany, 1939: 149).

Equally one might ask: why specifically cattle and not small stock? The Samburu did not cultivate, but they did have large flocks of sheep and goats. Elsewhere I have suggested that small stock are less demanding than cattle: they breed quickly and are easy to replace, and to this extent any relationships expressed through the gift or ownership of such an animal would be trivial (Spencer, 1965: 23). As a Maasai expressed it to me more recently: 'We say that sheep and goats are like milk: to be consumed'. Thus cattle are additionally valuable because they have a certain scarcity, or - to express this slightly differently - because relationships among large (even dispersed) groups of people are powerful and ultimately in a loose sense about power itself, they can best be expressed through possessions and transactions that have a certain scarcity value, and for pastoralists this is most appropriately their cattle (or camels in other parts of East Africa).

Some estimates, admittedly, have suggested a startling ability to increase among cattle - as high as 20% a year. Such a figure, however, appears typical only of a relatively brief period following a severe drought when there have been

heavy stock and, with good grazing and reduced pressure on the land, the herds began to recover. Dahl and Hjort in a wide survey have calculated 3.4% as a more typical annual growth rate, while for the Samburu I have cited evidence suggesting that, because of the close symbiotic relationship between the pastoralists and their herds, in the longer term the cattle population can grow no faster than the human population, which currently is increasing perhaps by about 2.3% a year. For the Fulani, Stenning has considered the problem of simultaneous biological growth among the human and cattle population in detail (Dahl and Hjort, 1976: 66; Spencer, 1973: 10; 1974: 421; Stenning, 1959: 147f; c.f. Frantz, 1975: 340).

In terms of their growth potential and scarcity value, then, cattle and small stock are of a different order, and to refer to small stock as small change, as is sometimes done in describing predominantly cattle-owning groups, tends to gloss over this vital point (e.g. B A Lewis, 1972: 32). It is not normally easy or cheap to convert from small stock to large; they belong to separate spheres of exchange.

As a rider to this, it might be added that direct comparison between the cattle-complex of East Africa and nomads in the Near East, who rely primarily on sheep, poses problems. Barth's analysis of sheep as capital among the nomads of south Persia provides a useful model. In both types of economy the stock owners exercise certain choices, but with radically different types of stock, the nature of these choices are very different.

Thus, while Barth notes the problems of managing large flocks of sheep, the argument develops rather differently when considering a growing herd of cattle in a highly polygynous area such as East Africa. Those elders who do actually manage to build up large herds are equally likely to have a large family with sons of all ages. If there is a problem of managing the whole herd in one place, because of the scarcity of pasture or the fear of some local epidemic, then the family can develop separate branches of the business, with overall control from the centre but largely self-contained on a day-to-day basis. So long as the herd continues to be conceived of as a single unit, it can grow indefinitely, with different members of the family and their wives attached to different branches. Once a flock of

sheep is divided in this manner, however, the opportunities for the local manager of a branch to cheat are considerable, and there is not the basis for building up trust that can exist with cattle whose slower growth and smaller numbers give them a greater individuality. Even with his herd dispersed, the stock owner knows about every cow, bull and ox in detail, and retains a personal concern. It is not so easy to cheat.

But sooner or later, especially if the herd splits up, junior members of the family want a measure of independence, and inevitably family development is punctuated with a number of potential crisis points, which characteristically vary from society to society. Among a number of Islamic societies, it is the marriage of each son which marks his right to a certain independence from his father (Lewis, 1961: 84; Stenning, 1959: 120; c.f. Barth, 1964: 74), and typically among the non-Islamic societies it is the death of the father that marks this right to independence. But there are definite variations in the pattern, and even after the death of a father a set of brothers, as among the Jie, may continue to acknowledge a joint interest in their shared herd (Gulliver, 1955: 55).

To emphasize that this is typical of a family enterprise in a situation of general growth, and not just peculiar to pastoralists, one may compare this general pattern with Burton Benedict's comments on 'Family firms and economic development', also based on material primarily collected in East Africa. Benedict identifies two major points of crisis. The first generation crisis occurs at the point when the sons of a successful businessman reach maturity and have acquired all the necessary skills to handle a business of their own; and the astute father will bow to this desire for some independence by increasing their responsibility, putting them in charge of a specific sector or branch of the business. However, with the dispersal and growth of the firm, and especially after the father's death, the continued development of the firm as a unified body depends on the trust and spirit of cooperation between brothers, which is less likely to be maintained by the next generation who were not brought up together in a single household. It is the loss of trust and the divergence of interest which comprises the second generation crisis. The problem of parallel development of family and business is also relevant. The firms that Benedict discusses happen to be so successful that by the

second generation there is a need to take on more personnel than the family alone can provide, and among them men of a better calibre than are likely to be born by chance into the family. In such an instance the business has outgrown the family. In other firms where the father does not bring his sons into the business and train them, the family will outgrow the business and the sons will leave. To insure against the severe risks of the developing economy, there is a network of inter-marriage and associated credit arrangements. Altogether, the boundary between family and business is ill-defined; the firm is an integral aspect of the family and of kinship links (Benedict, 1968).

The parallel is obvious, except that the pastoral economy is more demanding with virtually no alternatives to the family herding business - rarely do people drop out and no one would normally be brought in at an executive level - hence the symbiotic relationship has to be maintained with growth. But smooth development cannot be taken for granted. Among the Turkana, for instance, the family firm hardly reaches the first generation crisis point before it is challenged by the oldest son who soon achieves his independence; and stock-owning units among the Turkana do not normally build up into larger enterprises beyond this first generation (Gulliver, 1955: 133f). As compared with other East African pastoralists, however, there is an apparent spontaneity among the Turkana and one is led to examine the social organization of other less spontaneous groups for customary practices that perhaps serve to support the family past these various crisis points, and generate larger and more stable family firms.

Among the Maasai, for instance, a young man's sojourn at the warrior village does not entail his final break from his father's control (as my own earlier reading of the literature had led me to assume: Spencer, 1976: 170), but it does appear at least to mark a clear break from his earlier role as a herd boy, and he returns with a certain claim to adult status within the firm. This appears to be an institutionalized arrangement for handling the first generation crisis point. Again, among the Hima, a man's first marriage does not mark a step towards independence from his father, but is accompanied by a number of duties which tie him down to his father's household just as he has reached a point when he might be tempted to wander elsewhere. Among the Jie, the age organization, which strictly

defines membership of a generation and demands respect for all members of senior generations regardless of age, appears associated with the survival of the firm beyond the death of the father so that marriages are jointly arranged and the heavy burden of bridewealth is jointly shared well into the second generation. The developed concept of lineage, especially among the Islamic pastoralists, appears associated with the even greater extensiveness of the stock-controlling unit which was previously noted (Elam, 1973: 186f; Spencer, 1976: 176).

This concept of pastoralism as a family business is hardly an original idea. The notion of extended families as corporate property-owning groups is established in anthropological jargon. The emphasis here, however, is on the economic aspects rather than the legal, and on the implications of growth and development for the enterprise. The pastoralists do not merely own cattle; they have a productive investment in their stock, and also in their labour and skills. In this sense, they may be regarded broadly as capitalists.

It is not perhaps altogether coincidental that in English the terms 'cattle' and 'capital' are linked, and that they derive from the Latin word for 'head'. This derivation may be compared with a Maasai saying cited by Hollis: "'One cow resembles a man's head'. They mean by this that if a man has a cow, which he looks after and tends, it bears and by so doing enables him to live, for he can marry and have children, and thus become rich.' Cunnison has noted an identical attitude among the Baggara, and Evans-Pritchard a closely similar one among the Nuer (Hollis, 1905: 298-9; Cunnison, 1966: 31; Evans-Pritchard, 1940: 19; 1956: 259). Here what Cunnison refers to as 'the cattle urge' and Evans-Pritchard as an 'obsession' with cattle, I will take a cue from Paine (1971) and term 'rudimentary capitalism': a single-minded interest in the growth of the family and its herd through the production and exchange of cattle *and* women. Or if Marxists remain unconvinced of the aptness of this particular term on the grounds that labour is not freely exchanged, then it should be pointed out that there appears traditionally to have been employment beyond the immediate family by unusually wealthy men in a number of these societies (possibly all): this is reported among the Somali in relation to distant kinsmen, among the Borana in relation to non-kin, and among the Maasai in relation to non-tribesmen (I M Lewis, 1975: 428-9; Baxter, 1975: 209;

East African Protectorate, 1913: 196; c.f. Frantz, 1975: 342). The distinction between East African pastoralists and Western capitalists may have been more one of scale than of kind. On the other hand, it has to be admitted that if one were considering the status of women as humans rather than as commodities equivalent to cattle, then in Marxist terms a precapitalist model might be more apt: one that emphasizes their lack of freedom to exchange their services or to arrange their own marriages, victims of a system in which they do not even have the illusion of choice which characterizes capitalism. Yet the parallels are striking, and East African pastoralism is haunted by the ghost of capitalism. Marxists might object, but it is very likely that had Engels known of this East African phenomenon, he would have fitted it into his model of the patriarchal family as a direct ancestor of the inequality of the sexes in modern capitalism (1884: 137).

In precolonial times, there were in fact two co-existing modes of production, which for want of better terms one might refer to as 'predatory' and 'pastoralist' respectively. The predatory mode depended heavily on the exploits of young men as successful raiders to augment their herds, and it was they who effectively controlled this mode of production. The pastoralist mode depended on peaceful husbandry, controlled by the older men as individual stock owners, with the warriors, as a vital part of their apprenticeship for elderhood, defending the herds and maintaining the tribal claim to its territories and its vital resources of pasture and water. The articulation between these two modes of production can only be inferred. It seems likely that the predatory mode played a more important role in the southward drift of the Turkana associated with the loosening of parental control, in the dry-season camps of the Nuer when they raided the Dinka, in the rising influence of the Maasai diviners, and perhaps in all pastoralist tribes in periods of famine and political turmoil (Gulliver, 1955: 7, 189; Evans-Pritchard, 1940: 125ff; Waller, 1976: 542ff). However, peaceful husbandry would appear to have been a far more efficient manner of increasing herds. A rough estimate suggests that among the Maasai, each warrior would have had to acquire 20 cattle each *year* to compare with the more successful years of peaceful breeding, whereas only a quite outstanding warrior would have managed to acquire even half that number by

raiding in his whole career.¹ In fact, most of our knowledge of the Maasai at the height of their military might concerns their civil wars during the 19th century, when the gains of one Maasai tribal section would have been the losses of another, and the overall benefits of warfare for the Maasai as a whole would have been cancelled out by their losses. The pastoralist mode of production would seem, therefore, to have been the dominant form, associated with gerontocracy, while the predatory mode was perhaps more significant in maintaining tribal prestige and claims to territory, but was ultimately the dependent form. It was pastoral husbandry and not predation that held the more consistent promise of growth.

This notion that pastoralism is oriented in general towards growth is widely reported, but it contradicts a view championed by Sahlins that family-based societies lack the incentive to accumulate surplus. Without doubt, Sahlins makes a very strong case with a wide variety of examples. However, nowhere in developing his theme does he specifically consider pastoralism in detail, but appears to assume that youths were as indolent among the Maasai, for instance, as in non-pastoral societies: they were fighters as young men and only settled down as producers when they had families of their own. This completely overlooks the point made by so many writers that the aspirations of warriorhood among the Maasai (and indeed among many other pastoralists) are to acquire cattle. The predatory mode of production may be parasitic, but it is a mode of production nevertheless (Sahlins, 1974: 54; Thomson, 1885: 436; Evans-Pritchard, 1940: 50).

Pastoralism, then, is a major exception to Sahlins' contention that family-based economies spurn the acquisition of surplus, and one is forced to conclude that there is more than just one 'domestic mode of production'. Moreover, in parts of East and West Africa where alternatives exist, with a potentially rewarding cattle economy side by side with some other less profitable form, the general

¹ From data collected among the Samburu, it seems likely that each reigning age-group of Maasai warriors (*morar*) would comprise about 6% of the total population. With, say, about 12 cattle per person and a maximum growth rate through husbandry of about 10% per annum, the natural growth rate per active warrior would be $12 \times 10\% \div 6\%$, that is 20 cattle per annum.

trend appears to have been for the non-pastoralists to want to acquire cattle even to the point of crossing an ethnic boundary: far from being repugnant to non-pastoral hedonists, the capitalist urge is emulated. It is with this in mind that one should view the high reputation of the Maasai in East Africa. It was not just their military prowess, but their capitalistic success; and those who chose to emulate them did not simply want protection, but also cattle. In other pastoralist areas where the conditions were right, there are reports of Fur who took up Baggara cattle husbandry, of Rendille who took up Samburu cattle husbandry, of hunters and gatherers in parts of East African who merged into the neighbouring pastoralist populations, and of cultivators in West Africa who took up pastoral nomadism (Haaland, 1972: 149f; Spencer, 1973: 137f; 1965: 286f; Franz, 1975: 347). When conditions were not right, then the reverse process took place (e.g. Stenning, 1959: 6f; Franz, 1975: 347; I M Lewis, 1975: 437). This is not simply a random fluctuation between two economic forms. There was a definite preference to opt into the cattle economy voluntarily, and a risk of finding oneself stockless involuntarily and forced to search for some alternative ecological niche for survival. The cattle economy, like capitalism elsewhere, entails a high risk.

Sahlins notes the interal contradiction of the 'antisurplus principle' in the types of society he considers: an obstinate economic base which threatens the very survival of the society. Among the pastoralists with their high-risk rudimentary capitalism, there is also an inherent contradiction. The economy and its whole ideological base is geared towards growth and expansion and there is always a resilient optimism; a single surviving cow, albeit ageing and barren, can hold out hope of a rich future. Growth is life, propitiousness, good and God-given; while loss is ill-destined, malignant, and ultimately spells disaster. Even stagnation is regarded with misgivings. The contradiction here is that this optimistic ideology is not based on an absolute growth. As indicated earlier, the symbiotic balance sets a limit on the extent to which the cattle population can outgrow the human population. One man's success in building up his herds, converting his surplus to wives who will help him build up his family and ultimately larger herds, is another man's loss, since wives, grazing and water will be harder to find. An increase of total stock population will also increase the likelihood of a serious epizootic spreading through the area.

Two contrasting images of the problems of pastoralism in East Africa have to be brought together to appreciate this ecological balance. The first is the image evoked by experts responsible for controlling the pressure of stock on the land: overpopulation, overgrowth and ultimate destruction of the environment - in fact the exact opposite of Sahlins's perception of the underuse of resources. The second image is that evoked by the modern news media who report the devastating effects of each serious drought, and turn their attention to other matters during the periods of steady build up of the herds between droughts. There appears to be a sawtooth profile of steady growth offset by sharp and devastating loss every decade or so (Spencer, 1974: 419). These images then reflect the dual aspect of the high profit/high risk rudimentary capitalist economy. The symbiosis is maintained between strict limits, sustained as necessary by a certain opting out of and at other times an opting into the livestock economy. However, the optimistic ideology of growth persists regardless of the evidence to the contrary.

A point that has to be conceded to Sahlins is the appearance of pastoralism as a way of life which underutilizes its labour potential. The image of indolent pastoralists is widely shared: there is high gain with no toil in the fields, and such work as is necessary can to a very large extent be undertaken by boys. This is very different from Western capitalism, but the writings of Max Weber on the subject may be cited to justify the continued use of the term capitalism here.

Weber, largely in response to Marx's analysis of capitalism, sought to demonstrate that there are a variety of types of capitalism, each associated with its own ideological base and rational form. His analysis of Western capitalism is couched in terms of a historical model in which the mode of capitalism is seen to have developed alongside a pervasive change in attitudes.

Prior to the Reformation and in some areas well into the 19th century, a *laissez-faire* mode of capitalism existed which afforded the middlemen of trade a comfortable existence and the primary producers a market for their goods. Unfair though the system was and in many ways unmeritorious, there was a widely shared vested interest in maintaining it, and so long as it was not exploited to excess it was tolerated. This relaxed mode (or even mood) was followed, however, by a new, more calculating and rational form of capitalism which had little

tolerance for the inertia of the prior mode. A new attitude prevailed. Capitalism was no longer merely tolerated ethically; it now became part of an ethic in its own right, linked with a sense of religious revivalism, and a positive attitude towards initiative, innovation and the use of time, well expressed in the writings of Benjamin Franklin. It is this new ethic that Weber dubbed 'the spirit of capitalism'. It did not last, but it bore the seeds of capitalism as we know it today. Only a radical upsurge could have replaced the vested interests of the earlier system. Without attempting to follow Weber's analysis in every detail, one can postulate here a '*laissez-faire* capitalism', an 'ethical capitalism', and today's 'modern capitalism'. The point I wish to make in the remainder of this chapter is that all three types are present in East Africa today and the problem of development is not so much that of transition from one form to another, as of interaction between them. (And one hastens to add that components of each type coexist in our own Western society.)

First, one has to concede that there is a marked element of unutilized labour in pastoralist societies and a vested interest that resists change, in other words a *laissez-faire* mode of rudimentary capitalism. The growth of one man's herd is not seen as a loss for another. There is little scope for innovation in traditional terms, but rather an established pattern of herd management, of stock transactions, and for many a relatively comfortable existence. There is no concept that 'time' is a valuable resource that must not be squandered, or that though productive labour this 'time' could be converted to further capital. In normal times and with shrewd management, the capital herd will automatically increase, and minimal effort is required.

Having made this point, however, it would be equally wrong to imply that there is no pastoral ethic, no 'spirit' associated with this rather relaxed capitalism. The various institutions that serve to keep the family intact and the herd strong are backed by the strong uncompromising forces of public opinion. To the extent that one can envisage 'credits', 'debts' and 'marriage transactions', individual families have to be very credit-worthy and marriageable. The wider group is a moral community in a very stern sense. Similarly within the family, loyalty towards the father and care for the children are demanded, and any breach is a crisis,

which if followed by misfortune would be seen as a form of sin. Inevitably, it is the care of stock or their disposition that arouses the strongest feelings. Among the Maasai, there is no tolerance for a man who is ungenerous with food or who squanders away his stock. This is a rudimentary capitalism with a stern ethic, if not strictly a puritanical attitude (c.f. Paine, 1971: 167).

There are, then, these two contrasting moods among pastoralists. Among the Maasai, for instance, the more familiar mood of elders with time on their hands gossiping, quite often even drinking these days, and of *moran* (or warriors) equally freed of essential herding duties supports the general claim that pastoralism is an easy and rewarding pastime. Elders may wander out to meet their cattle in the evenings perhaps, or relax among their calves nearby at some point during the day, or even personally attend to the watering of their herd every second day. In this *laissez-faire* mood, there is a lucrative pay-off for very small effort, and little advantage to be gained by further effort. However, there is an immediate switch to the more demanding mood at times of crisis: when stock have strayed or been threatened by a lion or raiders; when water unexpectedly dries up and drought sets in; when a serious livestock disease spreads into the area; or when there is hunger. At this point no opportunity should be missed, no time should be lost, and there is no tolerance for any person who does not respond to the situation. There is a sharp shift of mood, a dedication to the survival of the family and the herd. If both can survive the rigours of such hard times and unexpected crises, then their joint growth during easier times is assured.

The second mood is never far from the surface, for animals may be lost or threatened at any point and without warning. Even when the society has every appearance of being relaxed and underproductive, it is as if the ghost of the 'spirit of capitalism' is ever present. The extensive gossip that one might associate with the *laissez-faire* mood is by no means always idle. It gives each elder a better idea of a wide variety of facts that may be relevant when next he has to make some decision on behalf of his herd or family; also through gossip he plays a part in sustaining the tempo of public opinion on a variety of issues. Such relaxed conversation frequently draws attention to the hazards: the unexpected misfortunes of one elder, the habit of drunkenness of another and his immoral

neglect of his herds, the miscalculations of a third who has recently migrated, the dilemmas facing a fourth and so on - gossip, perhaps, but not unproductive in every sense, and a very real reflection of the ethical and purposeful undertones of their rudimentary capitalism (c.f. Baker, 1975: 188).

This is not to disclaim drunkenness among the Maasai, nor the fact that some prefer to waste their opportunities and in this manner dissipate their herds. Rather, it is to emphasize the virtues of stronger men in their normal sober mood, which are couched in highly moral terms. Lapses from the ideal among the pastoralists - as no doubt in Franklin's America - serve to give a sense of prospective and conviction to their ideals. Whether the pastoralists are in a relaxed *laissez-faire* mood, or are responding to the call of the moment, the ethic persists. The Maasai who does not care would not get a wife.

This contrast in moods reflects the contradiction of growth noted earlier. It is as if there is a constantly nagging awareness of the sawtooth profile. The relaxed *laissez-faire* mood accords with the steady growth of herds without undue effort on the part of their owners, and this is seen as the benign face of normality. The sharp switch to an intensive concern for the whole herd or even for just one cow reflects an awareness of the cruel downturn of fortune that can strike at any time, and the rousing of a spirit that is almost closer to the predatory mode of production than to that of peaceful husbandry.

Clearly, the pastoralists' mood can only be equated with the 'spirit' of a particular mode of capitalism at a rather abstract level. It is suggested here that the major difference lies not so much in two types of ethic, both stern and uncompromising yet very dissimilar. It lies more in the fact that Weber portrays an ethic that represented an evolutionary phase towards modern capitalism, a 'spirit' that did not and perhaps could not last, whereas the pastoralists have an ethic that could probably persist for an indefinite period. Or to express this in a different way, Weber portrayed two successive, irreversible social forms accompanied by a striking shift in mood, while these pastoral societies appear to be characterized by a reversible mixture that changes with the context: the more intensive 'spirit' is switched on at every crisis.

The implications of this discussion for official attempts at various forms of stock control in the area are far reaching. It should be obvious that the development planner, like the anthropologist, needs to look at each pastoral society as a totality to appreciate their approach towards range management fully. One is dealing with an ideology as much as with ideas about what is good for cattle, and with a way of life as much as with individuals. This situation entails a variety of contrary forces for which there is no simple resolution: the needs of cattle as opposed to the needs of people, the aspirations of the stock owner as opposed to the expectations of the wider society, developing strains within each family, the ideal of growth as opposed to the likelihood of non-growth, and sudden switches in mood.

In contrast to this, one seriously questions how far imposed attempts at grazing control have incorporated ideologies and social factors into their ecological models. One frequently has the impression that the gap between 'schemes' on paper and formal agreements on the one hand and grazing practice on the other is altogether wider than is officially admitted. Boundaries are drawn and then ignored; individuals express a willing commitment and then retract; plans are bedevilled by drought; marketing arrangements are bedevilled by quarantine restrictions. The whole process appears fraught with a schizophrenic logic at every turn, and ultimately the traditional pattern appears to persist. It is as if the planners are trying to take on too much and expecting too much, ignoring the extent to which a useful ecological adaptation to the area already exists, with 'tribes' emerging as the ideal size in terms of self-sufficiency, with grazing patterns that adjust themselves efficiently to the environmental constraints, and with droughts playing a useful role in maintaining a longer-term ecological balance by periodically destocking an area. Above all, by operating outside the moral community, the planners cannot easily assess the strength of opposition to their proposals.

The important clue in this tangle of miscalculations is that both planners and planned can argue the rationality of their point of view. The real boundary that exists is not around the schemes, but between planners and planned, and it entails different ideological commitments. If there is a problem of alerting pastoralists to the longer-term dangers of their over-exploitation of the land, then

this at least is matched by the need for the planners to appreciate the full extent of the pastoralists' commitment to their way of life, the rationality of *their* rudimentary capitalist system, the strength of *their* morality, the meaning of *their* boundaries, and above all the extent to which these are aspects of a longer-term adaptation. The broader the concessions that can be made to these, the greater the likelihood of success.

Finally, though one hesitates to note this, planners should perhaps explore more fully the rationality of their own system, capitalist or otherwise. To the extent that the pastoralists find themselves confronted with an external economy which in truth bears certain hallmarks of a *laissez-faire* economy with vested interests at various points, they can have no incentive to adapt themselves. The problem of interaction with the modern economy is not that pastoralists are unnumerate, incapable of appreciating the value of money, or the value of innovations that benefit their cattle: as committed capitalists they understand many aspects of these very readily (c.f. I M Lewis, 1975: 437; Baker, 1975: 199-200). But it is precisely because they have this worldliness that they become fully aware of the vested interests of traders and middlemen, and of anyone else who appears to exploit advantage to his own ends. The occasional pastoralist can enter into this other world with advantage, but for the vast majority there is always a danger that they will see their own internal economy for all its faults as better adapted and giving them a better deal than some alien mode which appears poised to take advantage of them at every turn.

This criticism of planners' schemes reflects a recent criticism raised in economic anthropology against 'formalists', who also are held to ignore the institutions in which non-Western economic activity is embedded and to apply inappropriate, Westernized models. On the other hand, in pitting a 'capitalist' model against Sahlins's anti-formalist approach, I myself may appear to have adopted a formalist stance. I hope that the argument has been full enough to show that in this instance, at least, the analogy holds. 'Rudimentary capitalism' appears well and truly embedded in the institutions of pastoral societies; and one might argue that a view of 'primitive' man as universally unmotivated towards economic acquisition and gain is as much a particular brand of formalism as a planners'

assumption that there is no rationality in the pastoralists' desire to accumulate stock.

CONCLUSION

Evans-Pritchard (1940) is one writer among many who have drawn attention to the incontestable importance of cattle among East African pastoralists. Cattle hold a central position in the culture, relationships and conversations of the Nuer: they are the focus of their aspirations and the principal source of all their disputes. Generally in studies of this 'cattle-complex', pastoralism is portrayed in terms reminiscent of a family business, and, as in such enterprises elsewhere, there is a tendency to talk, think and live 'shop'. In a later work, however, Evans-Pritchard (1951: 90-1) shifted his focus from the relationship between men and cattle to the exchange of cattle for women: cattle are important *because* they bring wives who will bear children - daughters to bring back cattle and sons to herd them; and the cause of quarrels and troubles was now cited as marriage in relation to the system of bridewealth. It was a shift in emphasis from cattle as such to a *system of exchange*, and in this system bridewealth came to the fore as a major institution.

In this chapter it has been suggested that the view of pastoralism as a form of capitalism has to be broadened along rather similar lines. Of those who have considered the topic, Barth (1964: 70-1) has pointed out the relevance of livestock as capital for social and economic organization; Paine (1971: 168, 170) has referred to pastoralists as 'rudimentary capitalists' striving to multiply their herds; and I M Lewis (1975: 437) has described them as 'some of the thickest-skinned capitalists on earth'. In each instance, the emphasis is placed on the growth potential of livestock, with little consideration for capitalism as a system of exchange; whereas both Marx (1956: 84f) and Weber (1930: 17) have emphasized precisely this aspect - the accumulation of capital through exchange. East African pastoralism represents perhaps one of the simplest forms of exchange with only two principal commodities, and the parallel growth of family and herd in the perpetuation of their symbiosis. If not exactly capitalism in its most developed sense, then it is at least a rudimentary form, as Paine indicates.

Finally, it has been pointed out that the planners themselves should extend their concern from the management of cattle as such to social systems in a very wide sense. Cattle have a broader role when one examines the nature of the family business, its pattern of development, its ethic, and the total system of exchange. '*Cherchez la vache*' was an imaginative piece of advice for anthropologists given by Evans-Pritchard in 1940, but it is misleading advice for planners today who should be encouraged to extend their search, even to the exchanged women.

6. GROUP RANCH DEVELOPMENT AMONG THE MAASAI IN KENYA

by

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INTRODUCTION: TRADITIONAL MAASAI PASTORALISM

A basic dilemma in all pastoral societies is the situation brought about by natural exponential growth in the human and animal populations against a finite resource base. A number of self-regulatory mechanisms built into the pastoral mode of production have enabled these societies to maintain themselves through time (see Haaland, 1976). These mechanisms were supported by natural calamities which slowed down the net growth rates in both animal and human populations (e.g. the rinderpest and smallpox epidemics in eastern Africa in the 1890s). Drought has been, and still is, an important factor in regulating the animal population, and subsequently the growth of the human population.

The pastoral Maasai of Kenya and Tanzania are pure pastoralists with a long history of self-sustaining pastoral economy. Until the last decade or so, the Maasai subsisted on a purely pastoral diet composed of milk, blood and meat. There is evidence that this adaptation is of considerable antiquity, to the extent that the Maasai have acquired specialized genetic traits enabling them to absorb the high cholesterol content of a diet rich in animal fats (Jacobs, 1975: 409). Historical and ecological studies cited by Jacobs (1975:419) led him to conclude that:

Viewed in long-term historical perspective, it may be said that traditional (Maasai) pastoralism has had a largely beneficial effect on the ecological and economic development of Maasai-land, until, of course, fairly recently.

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The European colonization of eastern Africa reached the Maasai areas just after the epidemics of the 1890s. The Maasai were unable to resist the encroachment of European and African farmers on their traditional dry-season pastures, thus losing a portion of their most valuable land. With the consolidation of colonial rule came the so-called Maasai Moves of 1904 and 1911, in which the pastoral Maasai of Kenya were contained in the much reduced, government-controlled Southern Reserve. In more recent times, the Maasai have lost additional land through administrative decisions to keep them out of the wildlife areas gazetted as national parks and game reserves.

During the colonial period, the Maasai were also prohibited from acquiring the breeding stock they had used traditionally to upgrade their herds. As late as 1961, the Maasai were not allowed to purchase Boran cattle at the auctions in Isiolo. This prohibition reduced the quality and productivity of the Maasai herds, with the implication that a larger number of animals were needed per family for subsistence. Animal and human health services were also introduced by the colonial administration. There can be no doubt that this was a desirable development for the individual Maasai, but, combined with the factors mentioned above, these services served to increase the pressure on the environment by maintaining relatively high growth rates in both the animal and human populations.

After several hundred years of what seems to have been a self-sustaining and well balanced mode of pastoral production, Maasai society has recently undergone dramatic changes:

During the last half-century, however, Maasai pastoralism has begun to have detrimental effects on local environments, due largely to progressive over-peopling, overstocking and overgrazing that have resulted mainly from the loss of high-potential areas on which their traditional herding systems were formerly based. Paradoxically, much of the injurious effect has either been caused or exacerbated by poorly designed and highly erratic development schemes and policies that were imposed on them during this time (Jacobs, 1975:419).

The general situation in which the pastoral Maasai have had to make a living from their herds in the past few decades may thus briefly be summarized as:

- reduced grazing areas (particularly critical dry-season grazing)
- reduced herd productivity and quality
- increasing animal numbers
- increasing human population.

The problem of individual herd-owners maximizing their holdings, resulting in aggregate stocking rates that exceed the carrying capacity of the range, is common to a number of pastoral production systems operating under conditions of communal land tenure. Haaland (1976) demonstrated that this feature of pastoral production is generated by:

- the natural growth potential inherent in animal populations
- the use of livestock as legal tender in a number of social relationships
- the lack of investment opportunities outside the pastoral sector
- the economic rationality of maximizing individual herds.

The livestock holdings of an individual herd owner are thus not regulated by the carrying capacity of the pasture, but by the maximum amount he can possibly manage. There is no reason why an individual should reduce his herd for the common good, if there are no guarantees that the other users of the land will do the same. Overstocking is therefore not an expression of the pastoralist's greed or ignorance, but simply the aggregate effect of what at the individual level is the most rational and profitable (and sometimes vitally necessary) livestock management strategy, given the conditions created by unlimited access to pasture.

The role of livestock

The traditional Maasai diet is composed almost entirely of livestock products, particularly milk. Jacobs wrote in 1963: 'Up until five years ago, I would have estimated that agricultural foods form less than 15% of the total yearly diet throughout most of Maasailand' (1963:24). The figures he gives on Maasai herd composition (1963:22) indicate a high proportion of adult females - from 52 to 61%. Milk yields vary considerably, related to the state of the cow and the season: 'Average milk yields for most of Maasailand in the wet season rarely exceed two to three pints (1.1 to 1.7

litres) per beast per day and in the dry season this either ceases completely or drops to less than one pint' (Jacobs, 1963:24). The Maasai diet is now changing, and agricultural foods are becoming increasingly important. There are no recent figures available on the consumption of agricultural foods, however.

Cattle are important to the Maasai in several other respects apart from subsistence. There are numerous practical uses of cattle products, but more important is the utilization of cattle as legal tender for most social and economic transactions. Compensation and fines are paid in cattle, as well as bridewealth and inheritance. Gifts of cattle to friends and kinsmen also serve to cement social relationships and political affiliations.

All important Maasai rituals, such as those occurring at times of childbirth, marriage, circumcision or age-set initiation, feasts for sick persons or ceremonies to avert misfortune, are traditionally celebrated by meat feasts. Bullocks are the main source of meat at these times; on certain occasions, a specified colour or type of animal must be slaughtered.

The Maasai are among the wealthiest pastoral people in Africa and have been characterized by an extreme commitment to a pastoral diet. In spite of the importance of cattle in their diet and their economy, however, the role of cattle has not been as elaborately ritualized among the Maasai as among several other eastern African pastoral groups, such as the Nuer, Dinka, Turkana or Karamojong.

Traditional livestock management

The pastoral Maasai were traditionally organized in a number of distinct tribes or sections, each occupying a specific territory with its own autonomous political system, based on a localized age-grade organization. These sections were crosscut by a clan organization as well as the age-grades, so that members of any clan or age-set were found in several different tribes.

Each tribe organized its age-set separately, and individual male heads of compound polygynous families secured rights to communal grazing and water within their tribal boundaries by initiation into a specific tribal age-set. Families of one

Maasai tribe were prohibited from grazing their herds in the territory of another without first securing the latter's approval. Though in periods of drought or famine there was often institutionalized sharing of each other's resources, and occasionally some changing of tribal affiliations, families generally grazed solely within their own tribal territory and were prepared to defend these boundaries by force, if necessary, against unauthorized intrusions (Jacobs, 1975:414).

Within the tribal territory, a number of secondary units were found, called localities by Jacobs. These localities were self-contained ecological units, including permanent water and both wet- and dry-season pasture. The locality was the basis of the traditional Maasai herding system, which, in general terms, involved:

... transhumant herd and family movements from permanent, high-potential, dry-season pasture reserves based on permanent river, well or spring water supplies to temporary, outlying, low-potential, wet-season grazing areas based on rain ponds and other temporary surface water supplies (Jacobs, 1975:417).

The locality was also the basis for age-set activities. Each locality had its own age-set spokesman and its own council of elders which settled disputes within the locality and enforced customary law. These groups had their counterparts on the tribal level, but:

Such tribal councils met only to decide on and organize tribal age-set ceremonies, or to deal with inter-tribal disputes. The bulk of political activities were, thus, organized and carried out by local age-set councils, without recourse to the approval of the tribal council (Jacobs, 1963:45).

It is thus evident that the locality, not the tribe, was the important unit for the maintenance of relations within Maasai society. Perhaps the locality, more than any other unit of traditional Maasai social organization displayed characteristics of a corporate group, particularly with reference to authority structures:

Indeed, individual families secured rights to communal resources only by common residence within the same locality over long periods of time and by regular participation, involving specific obligations, in local age-set activities. Families would, thus, hesitate to move frequently from one locality to another because of the

rights and obligations that attached to local loyalties,
and the need to transfer them (Jacobs, 1975:415).

The localities have, according to Jacobs, still retained their importance as basic units of ecological and socio-political organization.

Control over livestock and labour is vested in individual household production units and flexible co-residential units referred to by Jacobs as cattle *kraal* camps. Livestock are owned by individual families and are herded and watered communally by the cattle *kraal* camp. Each locality contains a number of *kraal* camps (15 to 20 according to Jacobs), each consisting of some 6 to 8 families.

Kraal camps do not have formal leaders, nor is there any overall kinship organization to the camp in which political authority may be said to reside. Although some households in the camp may be related to one another, Maasai hold that a camp should not consist exclusively, or even predominantly, of members of one clan or smaller descent group. 'Better for kinsmen to live apart lest they quarrel over cattle', they say, or 'Grass is every man's property, not just one kin group's alone'. Although there are strong moral obligations to avoid disputes within the camp, there is no formal means of settling them within the camp. Maasai feel that the camp should reflect a friendly arrangement where no one has authority to order other people about. Independent families may and do co-operate in activities of common interest, but each camp's active corporate life is limited mainly to economic co-operation of a voluntary sort. They herd and defend their livestock collectively, but they neither fight nor possess specific grazing and watering rights in the area as a group. Thus each family of a *kraal* camp regulates its affairs as it pleases and acts independently as it chooses. Differences of opinion over herd management often cause families to break away and join up with other camps. Although some camps maintain a core of congenial members over several years, the majority of camps change frequently in composition (Jacobs, 1963:31).

It is clear that the cattle *kraal* camp represents a convenient arrangement to pool labour resources and to provide security. There are no clear authority structures formalized within such a camp and decisions on questions of animal husbandry, such as to sell, buy or slaughter, are not made collectively.

Formal rights of ownership to livestock are vested in the male head of the family. But though he makes formal decisions on the disposal of animals, ownership is complex and the household head is constrained by the rights other people have over particular animals. Cows, for example, are allocated to wives for milk and these animals will later be inherited by the sons of the wives to whom they are allocated. Other close relatives, age-mates and stock-friends also have vested interests in the herd which further restrict the freedom of action exercised by the household head.

GROUP RANCH DEVELOPMENT IN KENYA

Rationale

When traditional pastoralists are no longer able to expand freely over a large territory, a cycle emerges of human and livestock population growth leading to overgrazing and ecological stress and ultimately to severe losses in times of drought or other crisis. This pattern is illustrated by cattle population figures from Kajiado District in Kenya from 1944 to 1977, as shown in Figure 1. This figure shows a steady expansion of herds over normal years and losses of 50% or more during the droughts of the early 1960s and the late 1970s. The problem of inappropriate herd growth checked only by natural disasters can be said to lie in traditional ownership patterns, whereby animals are owned and controlled by individual household production units and pastures are owned communally.

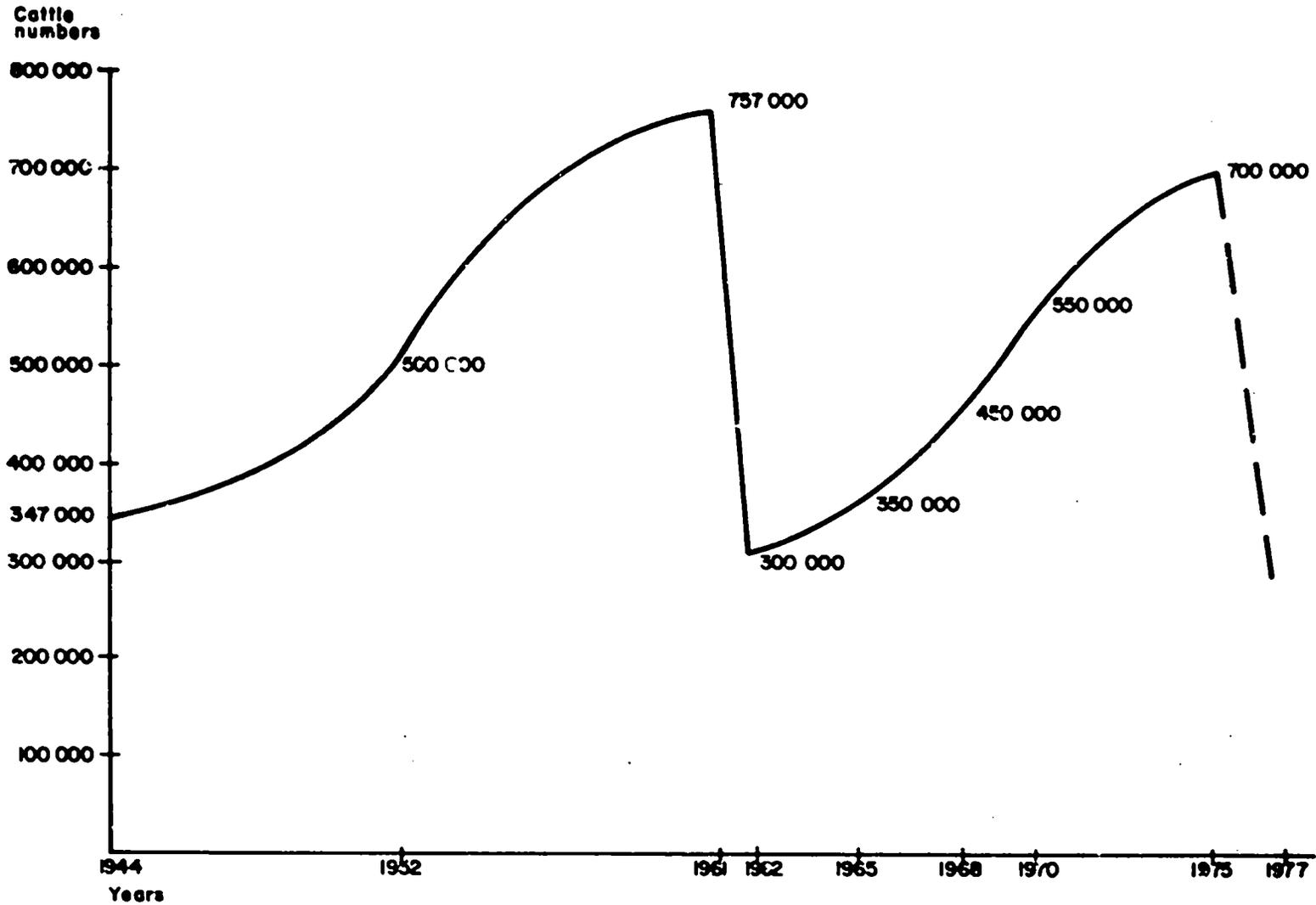
The basic rationale for the development of group ranches in the Maasai areas of Kenya has been to 'assign definite property rights to specific ... groups' so that 'the consequences of misuse and the returns to investment in future productivity are both made specific to the holders of those property rights' (Davis, 1970: 2-3).

The underlying objective of group ranch development in Kenya was to create a framework for development that would give the Maasai an increasing say in their own destiny. The more specific objectives may be summarized as follows:

- to increase the productivity of the rangelands by bringing them into commercial production

Figure 1

CATTLE NUMBERS IN KAJIADO DISTRICT, 1944-1977 (estimated carrying capacity: 450 000 - 500 000)



Source: Hoben (1976).

- to maintain production by keeping the stocking rates of the ranches within the limits set by the carrying capacity of the rangelands
- to conserve natural resources in the pastoral areas by controlling their exploitation
- to provide the human population of these areas with an adequate standard of living.

These objectives are to be achieved through:

- a. organizational innovations, such as
 - adjudication and incorporation of the group ranches
 - creation of responsible managerial bodies
- b. technical innovations, such as
 - improved breeds
 - measures against drought and disease
 - improved range management
- c. changes in production from subsistence pastoralism to commercial beef ranching through
 - increased offtake of homebred steers
 - increased offtake of cull cows
 - rapid turnover of purchased fattening steers
- d. changes in consumption patterns from subsistence on milk, meat and blood to greater reliance on purchased agricultural foods.

Demarcation

It is not always clear how the boundaries of the ranches have been established. Interviews in the field indicate that local Adjudication Committees suggest the boundaries, but that the government's District Range Planning Officer must also approve, taking account of the ranch's ecological viability. There are

indications that the Maasai themselves have been more interested in obtaining secure title to their land than in the specific boundaries of the ranches or the specific composition of the groups of owners (see Halderman, 1972: 13-14, and Jahnke et al, 1974:52). Much attention has been drawn to this problem in the discussions which followed the establishment of the first group ranches in Kaputiei Section. Serious doubt has also been raised concerning the ecological viability of the group ranches as demarcated (Halderman, 1972: 20-25).

The social groups identified as the basis for the group ranches are the *elatia*, the loosely composed and impermanent cattle *kraal* camps (Hedlund, 1971:7). Jacobs, on the other hand, has pointed out that the territorially and socially more important units are the *enkutoto*, which are ecologically, economically and socially self-contained localities (1963: 60-68). It is doubtful, however, whether any traditional unit of Maasai society has been used consistently as a basis for the formation of group ranches. One view is reflected in a remark made by Ole Sein, an influential Maasai who was active in the establishment of the Kaputiei ranches, in a conversation with Hedlund: 'We don't have any traditional grounds, we were trying to create them' (Halderman, 1972:13).

The group ranches that have been registered so far throughout Maasailand vary enormously in size, from the Keyian Group Ranch (891 ha/43 members) to, for instance, the Olkinlyie Group Ranch (78 700 ha/200 members), both in Narok District. In Narok District, variation in ranch size is related to variations in the potential productivity of the land, but even in Kajiado District, where productivity is more uniform, ranch sizes vary substantially, for example from Esokota Group Ranch (4 100 ha/72 members) to Elangata Wuas Ranch (59 500 ha/415 members).

Too much attention has been drawn to the size of the ranches, however, for this may not be an important feature. It is probably more important to discover the underlying factors and processes which resulted in the establishment and demarcation of the ranches as they now appear.

Structure

As has been noted, control over land in the form of grazing rights under the traditional Maasai system was vested in the tribe or section. This unit, however, was found to be too large to provide effective control of stocking rates and movements between pastures. The first step in the process of establishing group ranches in Maasai areas was thus to create smaller groups, both in terms of land and people, within the former tribal lands held in trust by the government.

The process of establishing a group ranch starts when the Kenya Government's Land Adjudication Department declares an adjudication section open for registration. This adjudication section is usually a location, the smallest administrative unit in Kenya. An Adjudication Committee is elected by the local pastoralists, usually composed of the traditional leaders or elders within the section. All subsequent claims to land rights within the adjudication section must be validated by this committee. Individuals who want private, individual title to land must register their claim with the committee. Boundaries for group ranches are also established and people are invited to register for membership. Membership on the group ranches must be approved by the committee, particularly in special cases, such as minors, widows or members already registered on other ranches. The committee's decisions may be appealed within 60 days. After this period, the adjudication documents are sent to the Registrar of Group Representatives who, through the Ministry of Lands in Nairobi, grants title deeds to both group and individual ranches.

After a group ranch has been registered, specifying a set of people (the group ranch members) and a plot of land, it is incorporated as a business enterprise which can hold property, acquire debts, etc. This involves the election of a number of group ranch officers. Three to 10 members are elected as Group Representatives

who act as legal trustees of the ranch corporation. The Group Representatives may or may not also be members of the elected Ranch Committee, a managerial body composed of a chairman, secretary, treasurer and other members. The General Assembly of all the group ranch members must adopt a ranch constitution, which is a standard document based on the Land (Group Representatives) Act (Laws of Kenya, Chapter 287), with a number of by-laws drafted to fit the circumstances of each particular ranch.

The incorporated group ranch then includes three different bodies:

- the General Assembly, which should meet at least once every 15 months. The assembly, which has wide powers, must have a legal quorum of 60% of the members attending
- the Group Representatives, who are the legal trustees of the ranch
- the Ranch Committee, which is the executive organ responsible for implementing the ranch development plans.

Ranch development plans are worked out by a Range Planning Team, which includes members from the Range Management Division (RMD) of the Ministry of Livestock Development and the Water Development Division. These plans include inventories of natural resources and other assets of the ranch, such as cattle, dips, boreholes and technical improvements. The production potential of the ranch is assessed and the carrying capacity determined. Potential carrying capacity (after development) is also estimated. Technical improvements are planned and budgeted as needed. Herd projections are worked out for a 10-year period, using parameters agreed upon with the Agricultural Finance Corporation (AFC), the government agency which administers development loans in the livestock sector. Culling and offtake rates are also determined.

On the basis of this information, stock quotas for the individual members of the ranch are worked out. If the ranch appears to be understocked, a number of steers may be bought in for fattening. The appropriate number of steers is projected at this time for a 10-year period, taking the herd projections and the expected range trends into consideration, and this number is distributed as quotas among ranch

members. The required improved breeding stock are also projected and grazing plans are worked out. On the basis of these development plans, development and working capital loans are granted to the group ranches by the AFC with the land as collateral. It is anticipated that these loans will be repaid by the increased sale of ranch-bred stock and purchased fattening steers. The projected performance of a hypothetical group ranch is depicted in Figure 2.

Problems encountered in the development of the Maasai group ranches

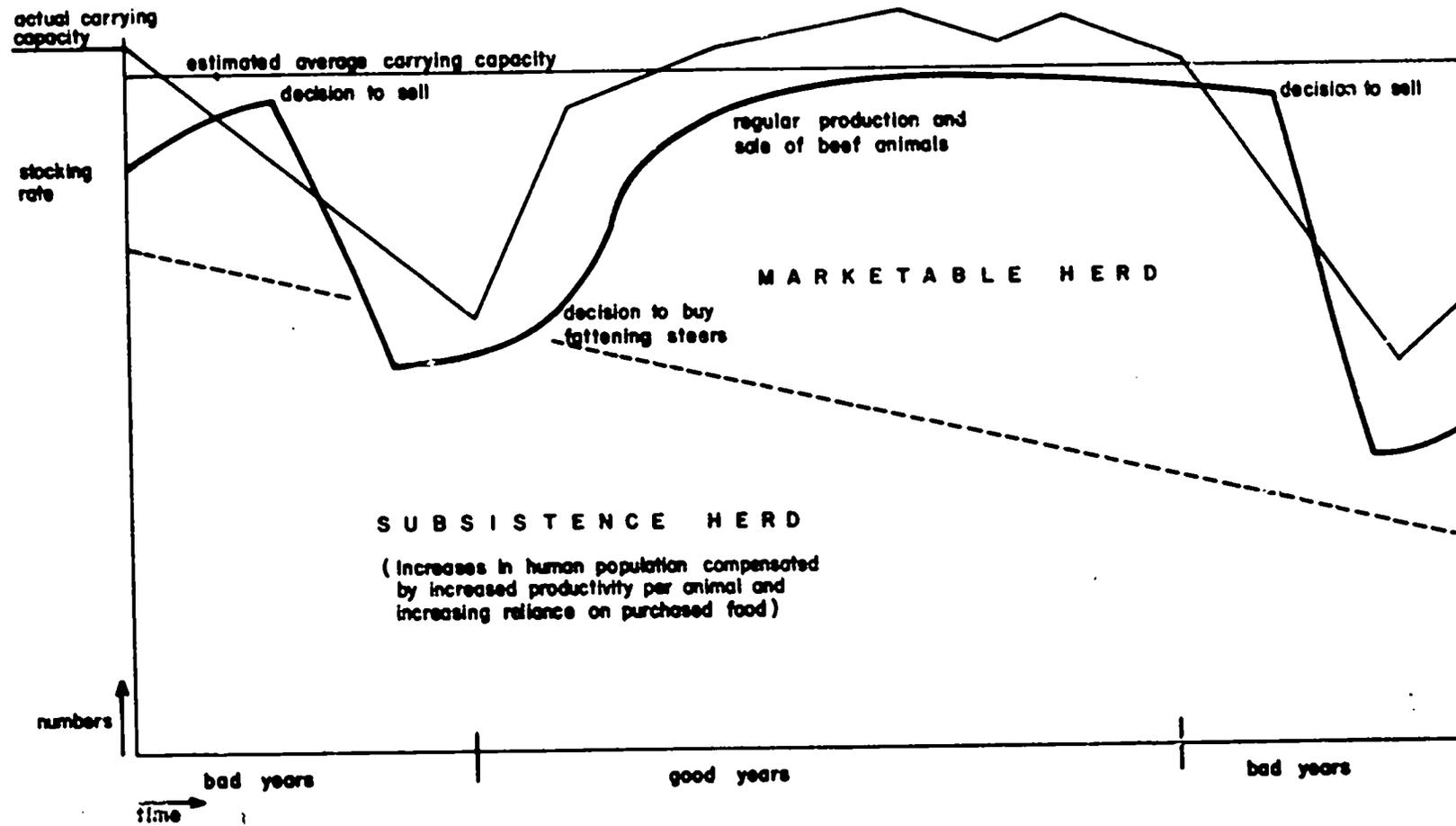
The development plans worked out for the Maasai group ranches are probably technically sound. Lacking, however, are 'explicit social theories or hypotheses as to how and why a particular plan or solution is likely to succeed' (Jacobs, 1972:335). The difficulties which have been encountered relate to unexpected reactions of the Maasai pastoralists which could perhaps have been better anticipated if their environment, production patterns and social behaviour had been more fully understood from the outset. These difficulties will be briefly described.

Provision of subsistence. One of the basic assumptions underlying the group ranching scheme is that Maasai consumption patterns will change towards a greater reliance on purchased foods so that over time the number of animals required for subsistence will decline, or at least remain constant, and a larger part of the carrying capacity will be used for commercial beef production. There is some evidence that the diet of the pastoral Maasai actually is changing towards a greater reliance on agricultural products. However, even if more grazing land is made available for commercial beef production, there is a limit to the income a group ranch can produce and thus to the number of people it can support. If the transition away from the traditional pastoral diet is incomplete, the subsistence herd must sooner or later increase to provide for a growing human population, no matter how much its productivity is improved. This would imply a proportional reduction in the marketable herd.

The cultural importance of the Maasai's traditional commitment to a pastoral diet should also not be underestimated. The Maasai diet serves as a focus of ethnic identity, setting the Maasai apart from their neighbours: a changed diet could mean

Figure 2

PROJECTED PERFORMANCE OF A HYPOTHETICAL GROUP RANCH



a less well integrated society. It is also debatable whether a change from the traditional diet, rich in animal protein, to a diet based on maize should be interpreted as a sign of development.

Stock quotas. The regulation of livestock numbers on the group ranches is based on quotas allocated to the individual ranch members by the government Range Planning Team. The ranch members are then meant to regulate their holdings according to the quotas they receive.

Livestock holdings frequently differ substantially among individual members of the same ranch, however. Data from two ranches in Kaputiei show that one-third of the members own from two-thirds to three-quarters of the animals (Jahnke et al, 1974: 40). Individual holdings range from no animals to several hundred. In this situation, there are conflicting views on how the stock quotas should be allocated. Wealthier ranch members naturally feel that the quotas should be based on actual holdings at the time of allocation, while poor members claim that, since all members have equal access to the ranch, stock quotas should be allocated equally to all. At present, range planners have adopted a compromise solution: all members are allocated a minimum quota (which must be sufficient for the individual household to maintain viability) and further allocations are given to the wealthier members. In practice, this means that the richer members usually have to reduce their holdings, while the poorer members may not even own enough animals to fill their quotas. The immediate problem is then to persuade the richer members to destock. In Kaputiei this has turned out to be difficult. Rich members have agreed to cull part of their herds, but have not actually done so. Nevertheless, the 'unused capacity' represented by the unfilled quotas of the poorer members has been filled with purchased fattening steers, thus producing a net increase in stock numbers.

Ranch management. Once the development plan has been completed by the Range Planning Team, the Management Committee elected for each ranch is responsible for supervising implementation. This entails:

- enforcing the culling rate stipulated in the development plan
- enforcing the grazing system worked out in the development plan
- supervising the construction and maintenance of the physical facilities provided under the AFC loans
- supervising the purchase, distribution and fattening of the steers bought on AFC credit.

It is assumed that the Management Committees have:

- the necessary information on which to base decisions
- the ability to reach decisions in line with the development plans
- the necessary authority to enforce decisions.

Technical information should be provided by field officers from the RMD and the AFC, based on field surveys and censuses as well as on routine records and accounts. However, these agencies lack sufficient staff or transport facilities to collect information on livestock numbers or range condition: the most recent livestock population figures for the Kaputiei ranches were collected in 1973, for instance, and there is no evidence that range condition has been recorded along established transects since a UNDP/FAO survey in 1967.

The first elected Management Committees were dominated largely by rich and influential individuals. In this situation, it is not surprising that the ranches have experienced difficulties in culling excess stock, since these committee members are not likely to enforce a decision which goes against their self-interest. More recently, efforts have been made to change the composition of the committees on several ranches.

Another difficulty is the practical task of arranging committee meetings. Personnel from the office of the Registrar of Group Representatives are required to attend these meetings, but this office is seriously understaffed. Communication is also difficult, and attendance at the meetings is low. According to Jahnke et al (1974: 47): 'The committee is not yet a distinct decision-making body, but acts when pressed by members, as in the case of incoming outsiders, or according to the

guidance of the RMD and AFC personnel who provide loans.'

The Management Committees also lack adequate sanctions to enforce compliance with their decisions. This is an important issue because control over livestock numbers and management practices outside the household runs directly against Maasai tradition. A further complication is the allocation of animals among household members and the system of exchanging animals with friends: the head of a household is not free to dispose of his livestock as he wishes, at least not without disrupting a number of relationships.

The Land (Group Representatives) Act provides rather vague instructions on the functions of the Management Committees without providing them with any clear sanctions which they may apply in support of their decisions: 'The committee shall assist and encourage members to manage the land or graze their stock in accordance with sound principles of land use, range management, animal husbandry and commercial practice.' On the other hand, the Act provides individual members with ample support for delaying or obstructing the enforcement of decisions taken by the committees:

Any person who is aggrieved by a decision of the committee, or of the group representatives, or of the Registrar of Group Representatives may, and if so directed by the registrar shall, apply to a subordinate court having jurisdiction in the area to determine the question.

In some instances, a Management Committee may be able to pressure ranch members informally to comply with destocking or other herd management decisions, particularly if the committee is composed of influential traditional leaders. On some ranches, the General Assembly may handle problems of compliance, though information from the Registrar of Group Representatives in Kajiado indicates that it is difficult to arrange a meeting of a General Assembly with the legal quorum of 60% on any of the group ranches in the area.

Ranch boundaries. Management Committees also find it difficult to prevent outsiders from coming into the ranches because members are reluctant to exclude their friends,

relatives and stock associates from other areas. The Maasai tradition of seasonal movements in search of better grazing conditions involves wide systems of relationships based on reciprocal rights to graze animals in the territory of other groups. Members of a fully functioning group ranch would perhaps be less dependent on these relationships because, with controlled grazing and well developed technical facilities, they should not have to move their animals off the ranch at any time. However, at present the facilities on the group ranches are not fully developed and stock quotas and grazing plans are not enforced, so the basic rationale for maintaining reciprocal relationships with other pastoralists still holds. (See Hedlund, 1971: 13. and Halderman, 1972: 5-7.)

Development loans. The AFC has provided a number of development loans to ranches in Kaputiei Section for technical improvements, such as water points and cattle dips, and for the purchase of fattening steers and improved breeding stock. Further disbursement of development loans for more recently established group ranches will depend on the completion of development plans and the allocation of stock quotas.

The rate of loan repayment has not been satisfactory in many cases, however, and the AFC lacks effective sanctions to enforce repayment. The collateral for these loans is the land itself, but it is clearly impossible to declare a group ranch bankrupt and sell the land. Thus, the AFC is left to seek out individual ranch members and try to persuade or coerce them into selling stock to repay their share of the loan.

Because the ranches lack the managerial capacity to keep financial records of loan receipts and disbursements, as well as the technical capacity to maintain the facilities which are installed, they generally find themselves in financial difficulties from the outset. Since technical improvements have not been accompanied by enforced stock quotas or controlled grazing, animal numbers have tended to increase, threatening the carrying capacity of the range and leading to heavy losses in times of stress such as the 1975-76 drought. In this situation, the ranch members are unable to repay their loans.

A note on the Samburu group ranches

The territory occupied by the Samburu, a people closely related to the Maasai, can be roughly divided into the Leroghi Plateau around the town of Maralal and the lowlands to the north and east. Annual rainfall averages about 500 mm on the plateau and about 250 mm on the lowlands. In 1933, the relatively high-potential plateau was recognized by the colonial authorities as a Samburu tribal territory. This recognition was soon followed by administrative initiatives to impose some kind of stock control over the area, which led to several armed confrontations between government troops and belligerent Samburu (see Spencer, 1973: 159-163.)

Controlled grazing schemes were eventually introduced on the Leroghi Plateau in 1952 and were gradually expanded into the lowland grazing areas. This entailed carving up the rangeland into grazing blocks of various sizes, with strict controls over herd movements and over animal numbers within the blocks. Large tracts of land were also closed off entirely to permit regeneration. By 1960, 3890 km² of pasture were being rested at any one time, plus 4408 km² of forest reserve permanently closed to grazing.

The schemes were successful in regulating grazing and controlling stock numbers in the designated areas, but at the cost of increasing the pressure on pastures elsewhere. As new areas were included in the schemes, hostility grew among the Samburu and control became increasingly difficult. In 1961, the issue of grazing control was put to the Samburu elders on the African District Council, and they chose to disband the schemes.

The shortcomings of the controlled grazing policies of this period have been described as partly ideological and partly technical. They were ideological in that they interfered with what the Samburu regard as their inalienable right to graze their livestock where they want, and also the pastoralists did not see any advantage in changing their herd management practices to allow for increased commercialization. The schemes also excluded small stock, which play an important role in the Samburu economy. Technically, the schemes only achieved controlled grazing in one area by

increasing the pressure on range resources elsewhere. They were based on an assumption that excess stock would be sold off on a regular basis, which turned out to be erroneous. (For a detailed analysis, see Spencer, 1973: 179-191.) According to range officers in Maralal, since the schemes were abandoned the Leroghi Plateau has been overstocked on a permanent basis and has also served as the main dry-season pasture for Samburu from the lowland areas.

By 1977, plans had been drawn up for five group ranches on the Leroghi Plateau and other ranches in the lowlands were at various stages of adjudication and incorporation. Government range officers initiated their first development schemes on the plateau just as the colonial administration had, because this area is easy to reach and is of relatively high potential. At the outset, the Samburu were enthusiastic about the group ranches, but the government planning team had not explained the concept of stock quotas to them or mentioned the immediate need for substantial destocking. The development plans included projected culling rates of 17 to 25% a year to bring stocking rates down in line with carrying capacity. Government planners admitted, however, that they had no strategy for convincing the pastoralists to destock except educating the people.

The five ranches which have been set up on the Leroghi Plateau are all fairly small, with a relatively large number of members. Although a number of these members appeared to be minors or absentees at the time of registration, it may be assumed that they will eventually all be heads of households living on the ranch. If this is the case and the ranches are stocked at 100% of projected carrying capacity, then livestock holdings will range from only 5.6 to 12 stock units per household. Even if some members die and other households leave the area, it is doubtful whether projected livestock holdings will be sufficiently large to permit household viability.

The Samburu group ranches are also experiencing some of the same problems which occurred on the older Maasai ranches: the Management Committees tend to be dominated by older wealthy men, and attendance at General Assembly meetings rarely reaches the legal quorum of 60%. Finally, until new dips are constructed and veterinary services improved, Samburu District will probably be closed off from livestock

markets by quarantines during most of the year, which will seriously limit opportunities for cattle sales.

A small hopeful note appeared in a Nairobi newspaper in May 1977:

Overgrazing to Stop

Elders at Loroki Division in Samburu District will practise controlled grazing in the area. The resolution came at a joint meeting of four locations organized by their chiefs at Kisima near Maralal town following the invasion of their land by cattle from neighbouring divisions (*Daily Nation*, 17 May 1977).

The four locations mentioned in the newspaper article were those on the Leroghi Plateau where group ranch plans were most advanced, and the people who were to be kept out were from the neighbouring lowlands. It remains to be seen whether this intention to prevent outsiders from bringing in their herds represents a real commitment to control grazing, and the implications of such a commitment for pastoralists from the lowlands must also be worked out. In summing up the experience of the grazing schemes during the colonial era, Spencer (1973:191) states:

It seems rather unlikely that any new grazing policies, however technically sound, can hope to succeed without the ready collaboration of the people themselves. It seems equally unlikely that any concerted move in this direction by the tribe as a whole can hope to succeed if it is based on an imperfect appreciation of the total problem.

LESSONS FROM THE GROUP RANCH EXPERIENCE

The development of group ranches in Kenya is meant to achieve a sustained level of livestock production adequate for commercial offtake and subsistence needs by providing infrastructure, improving grazing management and bringing stocking rates in line with the carrying capacity of the rangeland. In these terms, the early development of the Maasai group ranches in Kaputiei Section cannot be considered a success. Unfortunately, very little is known about why they were not successful or how the design of similar projects can be improved in future. Indications from the early planning stages of the group ranches in Samburu District suggest that similar problems will occur in this area.

Two explanations have been offered for the problems encountered by the group ranches in Kaputiei. Halderman (1972) claims that the ranches as demarcated are simply not viable in ecological or economic terms, while a later World Bank Review Mission points to poor management and inadequate supervision.

A good deal is known about conditions in Maasailand both before and after the introduction of the group ranches. Thus, it is known that the group ranch inputs did not produce the results expected, but less is known about what consequences these inputs actually have produced. It may be true that, 'sociologically the program is having a major impact on pastoral thinking; but technically it has been disappointing although there have been some redeeming features' (World Bank Completion Report, Credit 129-KE:36), but the purported 'major impact' has not been adequately documented, nor has it been demonstrated how this impact has been produced or what implications it will have for the future.

The Kaputiei group ranches were heavily overstocked before the drought of 1975-76, and they experienced major livestock losses during the drought. This implies that development efforts either failed to achieve what they were supposed to do or actually achieved the opposite. To evaluate the consequences of development projects more fully and identify unintended results before they become irreversible, Jacobs calls for a system of continuous social monitoring and information feedback to planners and administrators:

... All innovation schemes should allow for unintended or unwanted consequences. A continuous and systematic monitoring for such consequences is an essential feature of all successful schemes. One of the best ways of dealing with unintended consequences is to incorporate into the plan at least one independent social researcher, whose principal task is to monitor the planning and implementation process, in order to identify successful innovation and unintended or unwanted consequences in sufficient time to introduce corrective measures (1972:336).

In the context of the group ranches, planners need information on:

- how the pastoral social and economic system works
- how project activities and inputs affect the pastoral system

- how the pastoral system affects project activities and the realization of project objectives.

Anthropologists cannot content themselves with supplying descriptions of social systems before, during and after development activities, listing characteristics and traits at different points in time; rather they must try to describe how change occurs. For this purpose, pastoral societies may usefully be viewed as patterns of individual production units allocating their labour and other resources according to their objectives and their perceptions of the environment. Anthropologists need to come to grips with the basic issues of what alternative allocations are possible in a given environment and what determines the choices people make.

To understand how individual production units are operating, an anthropologist must identify:

- the cognitive categories by which people perceive and order their environment
- the values which determine the ends people pursue
- the available technology, which limits the range of feasible alternatives
- the environment, including the actions and reactions of other social units.

Furthermore, in some cases successful strategies adopted by a few individuals may be replicated by others, while in other cases success for some reduces the resources available to others and ultimately exacerbates social and economic stratification. If all these factors are sufficiently understood, it should be possible tentatively to predict how changes in the production environment brought about by development activities will affect the productive activities of the pastoralists.

This type of research involves investigations at two different levels. Through conventional anthropological field work, the factors which determine how a social system functions are studied in detail. On the basis of such a study, a model is formulated which depicts the adaptation of individual production units to their physical, social and economic environment. Data collected from broader surveys are then used to test and further refine the model, and to indicate changes in society and the environment over time.

7. SOCIAL ORGANIZATION AND WATER CONTROL AMONG THE BORANA OF SOUTHERN ETHIOPIA

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INTRODUCTION

A problem common to a number of eastern African cattle-herding societies is one of increasing imbalance in the ecological systems on which they are based. Animal and human populations are growing, while the pasture resources on which they depend are diminishing, both in terms of grazing area and range productivity.

The situation has been brought about by a variety of factors. An explanation of the crisis which pastoral societies are currently undergoing must be sought partly in relationships intrinsic to the pastoral mode of production and partly in external factors due to the changing natural, economic, political and administrative environment.

Cattle are the main production factor in these pastoral enterprises. Cattle are productive capital. But since animals produce other animals, a major product of this enterprise is capital gain, i. e. the bulk of the income produced is automatically re-invested in the enterprise unless the herd-owner decides to remove animals through sale or slaughter. The owner is thus always faced with potential growth in his pastoral enterprise. Under conditions of communal land tenure and free access to pasture for community members, there are no limits, except those imposed by labour requirements, to the number of animals it is advantageous for the herd-owner to accumulate. Communal wealth (pasture) is in this way transformed into private wealth (animals). Reducing the herd means saving the communal resource, but without any guarantees that this saving will benefit the individual¹, as long as there are no organizational mechanisms to prevent others from grazing the pasture the individual has saved.

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On the aggregate level, this of course leads to overstocking of the range and overgrazing. As pressure on the pasture mounts, productivity per animal declines and the herds become increasingly susceptible to disease, drought and starvation. In this situation even minor fluctuations in range productivity may trigger mass herd mortality, as has been demonstrated by the Sahelian drought of 1968-74. Under traditional conditions, livestock deaths result in a reduced human population in the range areas, leaving the pastures understocked for some years until the more fortunate pastoralists can again build up their herds to critical levels.

Another special feature of pastoral production must also be mentioned here. In a pastoral enterprise, a certain amount of labour is required. On the one hand, the labour that is required for the care of one animal is usually sufficient for several animals. On the other hand, once the minimum labour requirements are met, the productivity of the herd will not increase with the introduction of more labour. A minimum labour force is thus a necessary asset to the enterprise, but if and when this labour force grows, the enterprise is not directly rewarded by higher production. The critical factor is productive animals, and an excessive labour force becomes a threat to the economic viability of the management unit.

The economic viability of households is of course also related to stocking rates. As pressure on pastures mounts and productivity per animal declines, the threshold for viability becomes higher, i. e. the number of animals required for the subsistence needs of one person increases. Consequently, one would expect an increasing number of households to fall below the subsistence threshold. In this situation, the options are limited to either consumption of the productive herd capital, with subsequent elimination of the household from the pastoral sector, or an increased involvement in other subsistence activities. For a more thorough discussion of these points, see Barth (1973) and Haaland (1976).

The various organizational forms of pastoralism may be seen as adaptive techniques that have evolved through a long evolutionary process. The adaptive success of these techniques has proved itself through the very survival of the societies in question, but it is equally important to bear in mind that these adaptations

evolved and were adequate under circumstances that were different from those existing today. The self-destructive aspects of pastoral adaptations were checked by a number of regulatory mechanisms, such as tribal warfare as a means of expanding territorial holdings and expelling competing groups, disease and famine as a control on net growth rates of both the animal and human populations, and the departure or absorption of non-viable households, which all served to adjust the ratio of human consumers to the niches they were exploiting.

While the self-destructive properties of the human adaptations in large parts of semi-arid Africa remain, a number of these regulatory mechanisms have knowingly or unknowingly been removed, through ill-designed development efforts and famine relief programmes. This is not to say that technical and humanitarian aid is bad, but rather that such aid could be much more constructive if it were planned in such a way that short-term benefits did not imply long-term destruction, or that individual adaptations to development inputs did not have maladaptive implications on the aggregate level.

The Borana of southern Ethiopia have so far been only marginally affected by development, and large-scale famine relief was introduced for the first time during the drought of 1973-75. The Borana, however, seem to have worked out a finely tuned adaptation to their environment which has caused comparatively little degradation. In the next section, the institutions of Borana social organization will be described. These imply a certain measure of control over the utilization of pasture and water resources, as well as over the reproductive performance of the human population.

THE BORANA POPULATION AND THE GADA SYSTEM

The Borana are found in northern Kenya and southern Ethiopia, where they occupy a more-or-less continuous territory extending from the Uaso Nyiro River in Kenya north to the Ganale River in Ethiopia. This report, however, will focus on the Borana areas in Ethiopia.

In Ethiopia, the Borana are found within the two *awradja* (provinces) of Arero and Borana, but their population distribution has not been studied. It seems reasonable to believe, however, that very few Borana live in the small towns

of the area and that the bulk of the population is found in the pastoral areas in the triangle between the towns of Tertelle, Arero and Moyale. The main reason for this assumption is that this area contains practically all of the deep perennial wells on which the Borana depend in the dry season. One would expect a seasonal variation in the distribution of the population, but this also must be the subject of future studies.

Census data for the Borana in Ethiopia are not available. Apparently, no census has ever been carried out. The population figures that exist are based on more-or-less accurate estimates and should be regarded with great caution. These estimates range from 30 000 people, which is obviously too low, to 230 000, which is probably too high.

A survey of the Sidamo administrative region carried out by the Ethiopian Central Statistical Office (CSO) in 1968 gives the total population of the Arero and Borana *awradja* as 105 500 people. This figure is not broken down by ethnic categories and the figure for Borana *awradja* is based on an old estimate. Borana *awradja* was not included in the CSO survey and the figures are thus not very helpful, either in assessing the total Borana population or in describing the population dynamics of the area.

The population estimates given in the AGROTEC report to the Ethiopian Livestock and Meatboard in 1974 do not specify the ethnic categories used, but lump various groups together as the 'pastoral population of the Borana Plateaux'. This population is estimated at 236 000 people. It is not known what percentage of this population is Borana and it is difficult to assess how exact this estimate is.

Population counts in connection with the relief operations in the area in 1973-75 indicate a total Borana population in Ethiopia of some 150 000 people. This figure is based on actual counting and, in spite of its obvious weaknesses, such as very irregular circumstances and poorly trained personnel, it is probably the best available estimate.

The only estimates of Borana population dynamics are given in the AGROTEC report. This report sets the rate of natural increase in the pastoral population at 1.5 to 1.8% per annum. Out-migration is estimated at 0.3% per annum and the rate

of urbanization at 0.2% per annum. The net growth rate of the pastoral population of the Borana Plateaux, of which the Borana form at least the large majority, is thus estimated at 1.0 to 1.3% per annum. It is difficult to know how exact these estimates are, but it seems that the growth rates of the Borana population are extraordinarily low.

Human reproduction among the Borana, and thus natural population increase, is regulated by several cultural factors. One factor peculiar to the Borana is the *gada* system, in which every Borana participates. *Gada* systems are also found in a number of other societies in southern Ethiopia, but these are not identical to the Borana system. The *gada* system is a complex organizational framework which divides the Borana population into a number of generation classes. These generation classes are again grouped in five series, called patriclasses by Asmarom (1973:189). The complexities of the *gada* system will not be treated here, but a few features and their implications for human reproduction must be pointed out.

A generation class in the *gada* system is known in Borana as a *luba* and the five patriclasses are called *gogessa*. Membership in a *luba* is ascribed to males at birth, while females derive a *luba* identity from the man they are attached to, first their fathers and later their husbands. The *luba* will be discussed here only with reference to males.

Membership in a *luba* is determined exclusively by generation. Age has nothing to do with *luba* affiliation and the age composition of a particular *luba* may be very wide. A new *luba* is opened for recruitment every 8 years, in one *gogessa* at a time, so that a new *luba* is added to each *gogessa* every 40 years. This means that there is always a time-span of 40 years between the *luba* of a father and the *luba* of his sons. The *luba* is never formally closed to recruitment and it exists as long as there are members belonging to it.

After a new *luba* comes into being, it passes through a series of grades organized in a cycle, so that a *luba* of sons enters any particular grade 40 years after the *luba* of their fathers. The *luba* goes through a number of rites in the different grades, and behaviour is regulated according to the current grade. These regulations only concern the *luba* members who actually are members while the *luba* is in any particular grade, but do not affect members born in the *luba* after it has been through the grade.

As a *luba* reaches the 32nd year of the cycle (the beginning of the 5th grade), its members are permitted to marry. Whether they actually do so depends on the biological age of the member, the availability of bridewealth, the progress of marriage negotiations and other factors, but no Borana may marry before his *luba* has reached this grade. While marriage is permitted in the 32nd year of the cycle, a Borana may not raise sons before the *luba* reaches the 40th year of the cycle and to raise daughters he must wait until the 45th year.

It seems to be well documented, both by statistical (Legesse, 1973:142) and observational (Haberland, 1963:200) evidence, that the Borana adhere strictly to these rules, even to the extent of practising infanticide in instances where the rules are infringed upon. The Ethiopian Government, of course, forbade the practice of infanticide many years ago, and it is rare today to find a Borana who admits that it still occurs. There are numerous examples of compromise solutions, however, where such 'illegitimate' children are given up for adoption outside Borana society, to missionaries, traders, townspeople or others. It is inevitable that these rules, delaying both marriage and child-rearing and reducing the number of children maintained by giving them up for adoption or practising infanticide, influence demographic trends among the Borana. With the present knowledge of Borana population dynamics, however, it is not possible to know how many people are affected by the rules or how these rules are articulated in the aggregate population. Any conclusions with regard to these questions would require detailed information on the age-structure of the different *luba* as well as on the marital history of *luba* members.

It may not be possible to explain the low growth rates of the Borana population with reference to the *gada* system alone, but any demographic description and analysis of the Borana must examine the *gada* system in terms of its implications

for population growth. If the *gada* system actually functions as a brake on growth rates, then it is a very important adaptive mechanism. If the *gada* system breaks down and at the same time health services, famine relief and government security measures improve among the Borana, the result is likely to be rapid population growth, which will of course have grave implications for the balance between human and animal numbers. Unchecked population growth will sooner or later reach a threshold where the carrying capacities of the niches exploited are exceeded, thus threatening the resource base on which the Borana population depends.

With present knowledge, the connection between the *gada* system and population trends among the Borana can only be described hypothetically. A corroboration of the hypothesis that the *gada* system results in reduced population growth will require thorough demographic analysis.

LIVESTOCK

For the purpose of this report, the Borana will be considered as pastoralists who depend exclusively on their herds for subsistence, either directly in the form of milk, milk products, blood and meat, or indirectly in the form of imported cereal bought through sale or barter of animals and animal products.

The cattle owned by the Borana are mostly a breed of the shorthorned eastern African thoracic humped Zebu (*Bos indicus*) known as the Boran Zebu. Some important characteristics of this breed are its high resistance to most indigenous livestock diseases, tolerance to heat and general hardiness. The Boran Zebu compares well with other eastern African breeds with regard to calving rate, calving intervals and milk production per lactation (see Payne, 1970:149). It is also considered one of the outstanding beef breeds of Africa (Payne, 1970:145, 148). Other breeds, such as the Abyssinian Shorthorn Zebu and the Small Somali Zebu, are occasionally seen in Borana herds, probably acquired through raiding.

The Borana also keep sheep, goats and camels. The numbers of these species vary from place to place, but the subsistence role of camels and goats is particularly important in the drier parts of Borana. Horses, mules and donkeys are also kept as riding animals and beasts of burden.

The estimates of the Borana livestock population provided in the AGROTEC report indicate approximately 820 000 cattle, 22 000 camels and 80 000 sheep and goats prior to the drought of 1973-75. No figures are available for horses, mules or donkeys. Reliable data on the composition, dynamics and productivity of Borana herds are not available. The same lack of data makes estimates of offtake, both in the traditional and marketing sector, difficult and unreliable.

CLIMATE AND TOPOGRAPHY

The Borana area of Ethiopia is located in the foothills of the Bale-Sidamo massif. The landscape slopes gently from the northwest to the southeast, between 1 500 and 1 000 m with peaks in the mountain formations reaching above 2 000 m. Only a small part of Boranaland falls below 1 000 m. The only perennial river is the Dawa, which runs through the northeastern part of the area.

Rainfall is thus the main factor underlying the availability of the two most important natural resources on which the Borana pastoralists depend - pasture and water. In the Borana area, as elsewhere in Ethiopia, rainfall seems to be correlated with altitude. Annual rainfall in the area ranges from less than 500 mm in the southeast to over 700 mm in the northwest. The rainfall pattern is bimodal, with the main rains (*ganna*) from March to May/June and the secondary rains (*haggaya*) from September to November. The period from June to September (*adolessa*) is characterized by heavy cloud cover, fog, mists and occasional showers, while the main dry season (*bona* or *bonhaggaya*) occurs from November to March.

Climatological data from the Borana area are scarce, but suggest that 50% of the total annual rainfall comes in *ganna* and close to 40% in *haggaya*. However, rainfall distribution, both in terms of time and space, is erratic and highly unreliable. Most of the rain is concentrated in heavy tropical thunderstorms, and downpours of 50 to 100 mm within a few hours in a limited area are not uncommon. Figures for runoff rates and evapotranspiration are not available, but they are thought to be high.

RESOURCE USE AMONG THE BORANA: PASTURES

This report focuses on how the Borana pastoralists exploit their two most important natural resources, pasture and water. Access to these resources in

Boravaland is gained primarily by maintaining a Borana identity - by being a Borana - and secondarily by subscribing to the Borana rules governing their utilization.

The use of natural resources is not only a matter of technology for the extraction of energy from nature, but also of:

... mechanisms of adjustment between human numbers and the carrying capacity of niches. The stability of the subsistence patterns, and thus of any culture or society based on those patterns, depends on the effectiveness of such mechanisms. By means of them, fluctuations or progressive changes in population produced by natural fertility and mortality rates can be 'corrected' and the rate of exploitation controlled, not by the ultimate adjustments of birth and death rates, but by imposed bars and incentives. These will mainly relate to recruitment patterns and involve monopolies on property or activities, supported by culturally determined views on legitimacy and thus ultimately by political sanctions (Barth, 1964c:5-4).

A study of livestock production among the Borana pastoralists should try to demonstrate how cultural factors have implications for the regulation of access to and exploitation of natural resources.

The rules regulating access to pasture are simple. Every Borana has the right to graze his livestock wherever he wants within the Borana areas. Pasture is free and cannot be monopolized by any particular group or person. The only limitation on this free access is that the lactating herds kept near the homestead and brought back for milking every night (*loni warra*) have priority over the dry satellite herds (*loni fora*). A *fora* herd may thus not move into an area occupied by *warra* cattle, while a *warra* herd may displace a *fora* herd.

In practical terms, however, these simple rules are greatly modified. With a limited water supply in the dry season, the area which can actually be utilized is sharply reduced. Cattle are watered every 3 days in the dry season at perennial wells, so their grazing radius is restricted to the distance from the water source which can be covered in $1\frac{1}{2}$ days. Pasture beyond a certain distance from permanent water is therefore worthless in the dry season.

Pasture is also limited by the erratic and unreliable rainfall pattern. This, together with high runoff, produces a situation where good pasture and no pasture at all may be found side by side. Even within a *warra* grazing area, the quality of the pasture may vary greatly.

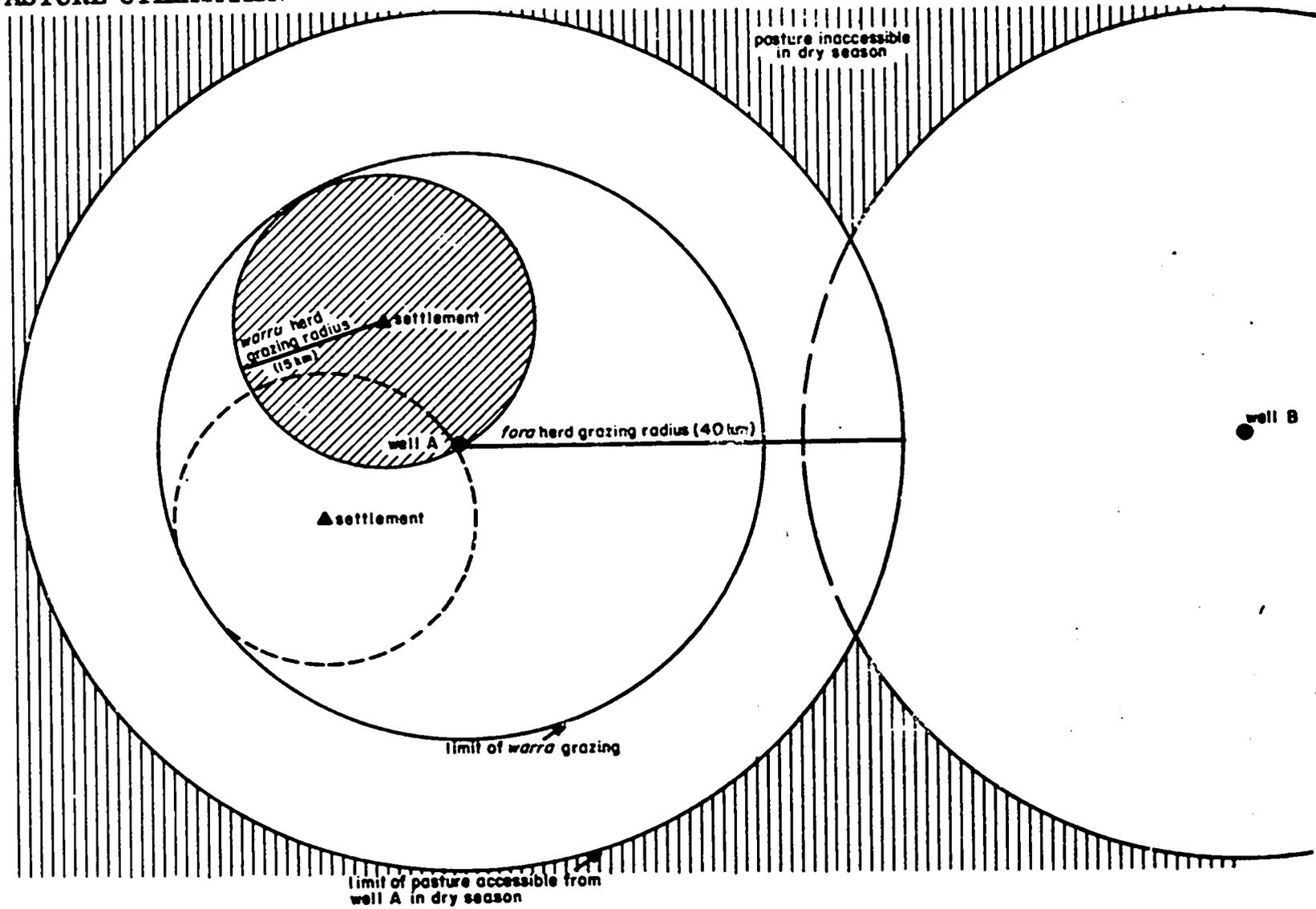
The danger of overgrazing within the grazing radii of the *warra* and the *fora* herds around the water points is counteracted by several factors. For one thing, the erratic rainfall pattern produces a situation of 'forced rotational grazing' as the grazeable areas vary from season to season. In the rainy season, the herds move out of the areas close to permanent water into rangeland which becomes accessible due to the presence of surface water. A grazing system approaching transhumance thus obtains, permitting the dry-season pastures around the wells to lie fallow during the rainy season. Different rainy-season pastures and different dry-season pastures may be available from year to year, depending on the vagaries of the rain.

A final consideration is the number of animals which can be grazed within the reach of a well and the number of animals which can actually be watered there. If the grazing radius of a *fora* herd is set at the arbitrary, but quite reasonable, distance of 45 km, a total area of 635 000 ha would be available for the *warra* and *fora* herds, as shown in Figure 1. If the carrying capacity of this area is 10 ha per head (also an arbitrary but quite reasonable figure), this means that 21 000 head of cattle must be watered daily if the range is stocked to capacity. Figures for the watering capacity of the different Borana wells are not available, but it hardly seems reasonable that this amount of stock could be accommodated.

The vulnerability of this situation was clearly demonstrated during the 1973-75 drought. Rainfall during this period was below average, barely adequate for grass growth but not enough to fill the surface-water ponds in the rainy-season areas. This meant that the Borana had to continue relying on their permanent water sources during the rainy season and consequently had to use pastures which normally would have been rested at that time. The pressure on these pastures mounted and in some areas serious overgrazing occurred. At some locations, normally permanent water sources dried up, resulting in even higher pressure on the pasture served by the remaining water points. The yield of all wells was well below normal, however, so the pressure on pasture was alleviated to some extent by increased herd mortality. The variations in cattle mortality even within the same area become understandable when one considers that people moving into a new area were at a disadvantage in terms of obtaining water from the wells which were already fully utilized. During this period it was not uncommon to see people lighting fires and working through the night to water animals from the wells.

Figure 1

BORANA PASTURE UTILIZATION



pasture served by well :
635 850 hectares

WATER AVAILABILITY AND USE

If pasture in Borana is freely accessible, water is not. The pasture which can be used at any given time within an area is not only limited by the actual occurrence of water, but also by traditional regulations on its use. Water is available in Borana from three basic sources which should be kept distinct since the sets of rights regulating their use vary considerably.

Occasional water, such as floods in dry riverbeds and natural pools and puddles of rainwater lasting for a few days, appear with some regularity in the rainy season, dotted over extensive areas. This source of water, known to the Borana as *lola*, is regarded in much the same way as pasture. Nobody may claim special rights over it or try to monopolize it, but where it occurs in the neighbourhood of settlements, these have priority for human use, much the same way that *warra* have priority over *fora* herds.

Temporary water, in the form of natural, man-made or man-improved basins and ponds, also occurs seasonally. These ponds are of various sizes and, given adequate rainfall, they fill up in the rainy season. Such ponds are known as *hara* and, given favourable conditions such as limited seepage, a *hara* may last for some weeks or even a month or two into the dry season.

A *hara* is not subject to quite the same regulations as a permanent well, but its use is much more regulated than that of *lola* water. A *hara* needs at least some upkeep and maintenance. Most *hara* are fenced in by thornbush enclosures which must be maintained, and silting must also be controlled. It thus seems reasonable to propose that the more reliably a *hara* reoccurs with the seasons and the more work goes into improving and maintaining it, the stricter the regulation of its use is likely to become, more like the use of the permanent deep wells that are found scattered in the central Borana territory.

The wells are the most important sources of water, constituting a crucially important element of Borana pastoralism. These wells, known as *ela*, are also important focal points of Borana social life. They are, without comparison, the most vitally critical resource. Economic and religious life centres on the wells

and they are a constantly recurrent theme in Borana politics. Upkeep, control, utilization and maintenance of the wells are the constant concern of all Borana. Access to the wells and the work connected with them are very basic considerations of any stock management unit.

Practically all the Borana wells are concentrated in about 35 locations in the central part of the Borana areas, to the south and west of the Dawa River (see Figure 2). Each location has a number of wells, usually between 10 and 20. The wells are of two types; both types may be found within the same location, probably draining different aquifers. They are either sunk deep through the rock (*ela tula*) or are shallow, wide shafts dug out in alluvials such as sand or gravel (*ela adadi*).

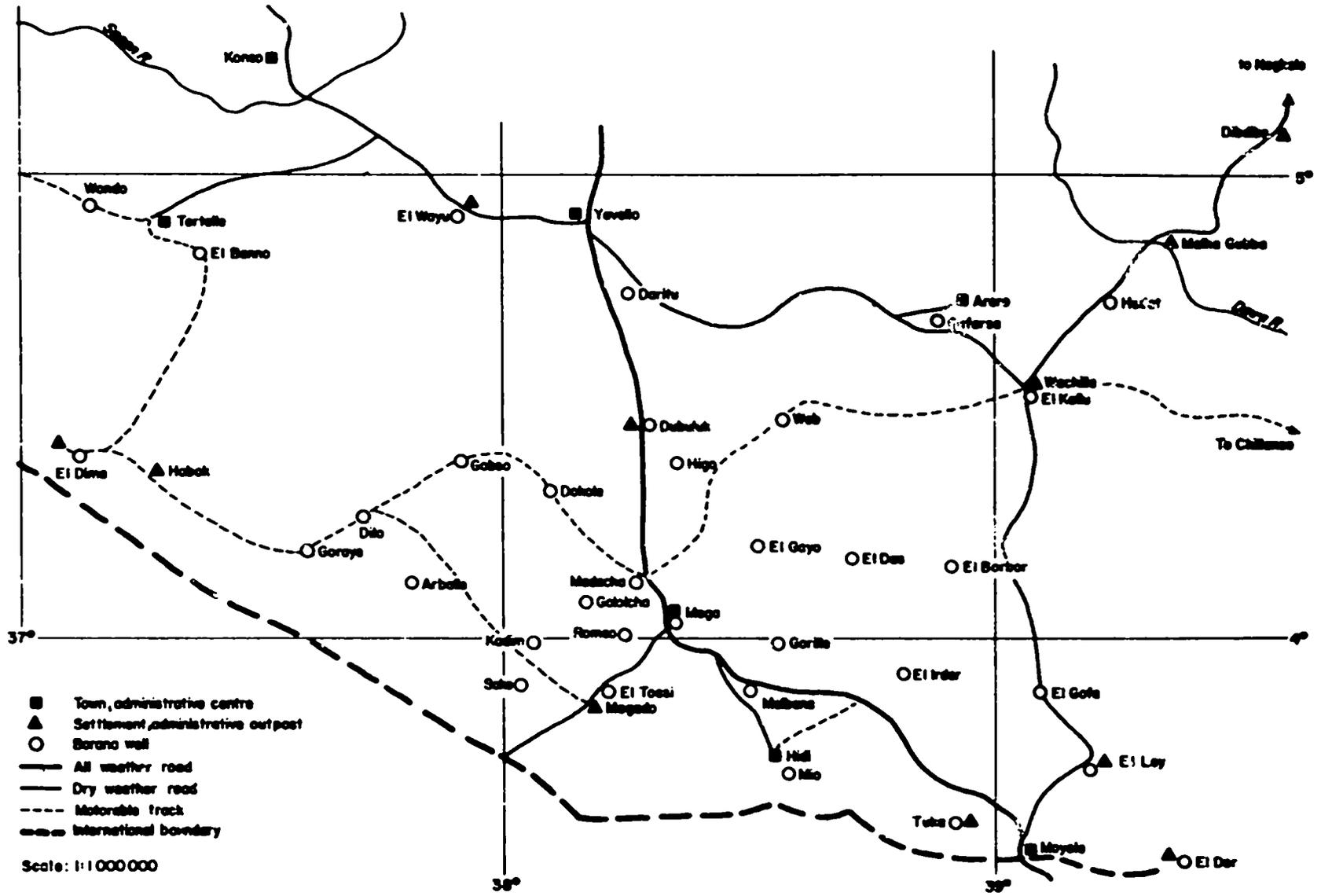
Adadi wells are still being excavated in Borana, but digging *tula* wells seems to be a forgotten art. It is not certain who dug the existing *tula* wells in the first place. Haberland is inclined to believe that they are the work of an ancient, unknown northeast African megalithic culture (1963:75). Legesse seems to accept that the Borana themselves dug them (1973:36), while the Borana claim that they were dug by the Warday, the southern Oromo people now found in Kenya, before the Borana expelled them from their areas in Ethiopia.

Whatever the case, such wells are no longer being dug. At the most, old shafts that have filled up with sand and earth through disuse may be recleared, but re-excavating *tula* wells and digging *adadi* wells are both formidable tasks. Haberland estimates that on average some 2 000 m³ of sand and earth must be removed (1963:76) and Legesse rightly points out that digging a well is a considerable task, requiring careful planning and an ample reserve of resources. In the example Legesse mentions, the re-excavation of an old *tula* well cost the entrepreneurs 280 head of cattle over a period of 7 months (1973:8.).

The total number of wells in Boranaland may thus vary slightly over time, but for practical purposes the number of wells may be taken as constant. The capacity of individual wells within the same locality may vary, but there is no clearcut tendency for wells of either type to produce higher yields.

Figure 2

DISTRIBUTION OF MAJOR BORANA WELLS



The use of Borana wells

The ownership of wells and the regulation of access to water among the Borana are complex. Every well is known as the 'well of clan X'. The clan identity of the well corresponds to the clan identity of the *abba ela*, or the father of the well. The relationship between the *abba ela* and 'his' well is known as *confi*. But, as will become clear later, it is difficult to translate *confi* to mean ownership in the Western sense of the word. The *confi* is patrilinearly inherited and cannot be lost, even if the well collapses through disuse and some one other than the *abba ela* or his descendants re-excavates it.

The *confi* may be transferred to a caretaker on a temporary basis if the *abba ela* moves from the location. An *abba ela* who is present at 'his' well is known as a *chokorsa*, while a caretaker is simply a holder of the *confi*. The holder of the *confi*, whoever he is, is kept under constant scrutiny by the *jarsi gosa*, the clan elders, who see to it that he discharges his obligations in accordance with the *ada-sera Borana*, the customs and laws of the Borana. In case of abuse, the clan elders ultimately have the authority to take away the *confi* from the *abba ela* and pass it on to a close agnate, but this happens very rarely.

The daily routines at the well are supervised by an officer known as *abba hirega*, the father of the watering order. The watering rota at a well spans 3 days. On the first of these 3 days the holder of the *confi* usually functions as *abba hirega* himself. The 2 other days are under the supervision of an *abba hirega* appointed by the well council (*cora ela*) which is composed of the users of the well.

Overall authority over the well is vested in the well council. Watering rights in any particular well must be gained and maintained through participation in this well council. The practical tasks of maintaining the physical structure of the well and its day-to-day operation, however, are delegated to officers more or less responsible to the council, including the *jarsi gosa*.

Both the *tula* and the *adadi* wells are of a particular construction. From the thornbush fence that encircles the well, a sloping ramp is dug into the ground. This ramp, which can be from 50 to 150 m long, ends in a wide platform dug out in the well shaft, some 5 to 10 m below ground level. Watering troughs of clay are

constructed on this platform, which is separated from the actual well-shaft by a low wall. In the shaft, a line of men, perched on rock outcroppings or on logs put down in the well, pass the water up in small leather buckets. Small intermediary basins are dug in the wall of the well shaft, which permit some men to rest without interrupting the work (see Figure 3).

The number of men in such a line, known as a *gogessa*, depends on the depth of the well below the platform. The deepest wells in Borana have *gogessa* of 15 to 20 men, while few are shallow enough to permit a *gogessa* of less than five. If the well shaft is wide enough, the personnel are available and the yield of the well will allow it, two or even three parallel *gogessa* may work in the well. It is also common to see two *gogessa* in certain sections of the well, usually between the top basin and the watering troughs.

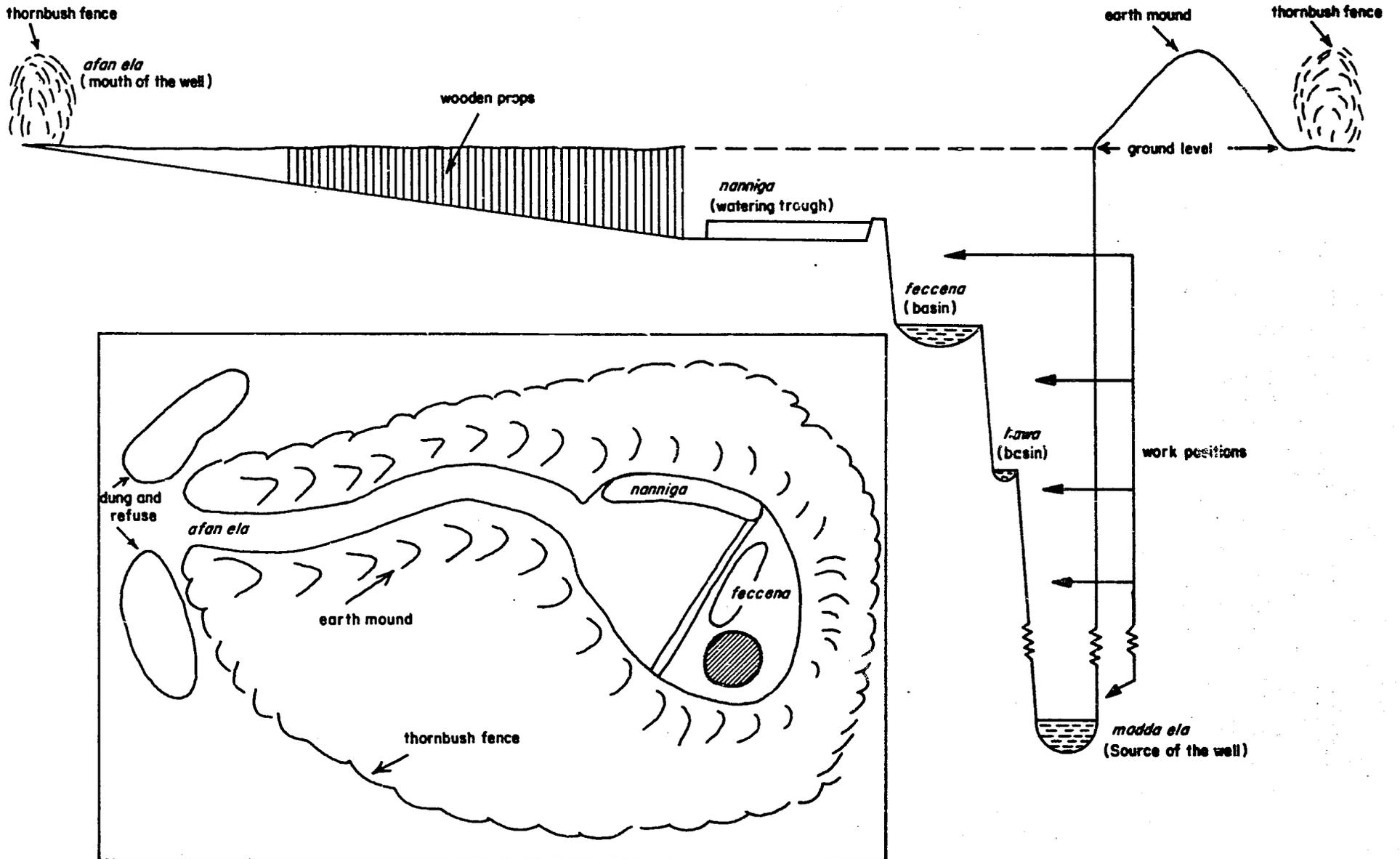
The *gogessa* contribute the basic labour requirements of the well. The back-breaking work of drawing water is usually the task of young men, but everybody who is physically capable, including women, may participate. The *abba hirega* organizes the *gogessa*, finds replacements and decides when extra labour is needed. He also has a few individuals under his authority to supervise the livestock. At least one man must be present at the entrance ramp and another one on the platform to supervise the orderly entry, watering and exit of the cattle. A man on the platform is also responsible for sweeping and cleaning the platform, regularly carrying the dung outside the thornbush enclosure. The man at the entrance admits only a few head of stock at a time, communicating with the platform supervisor through whistled signals.

The watering troughs are plastered with fresh clay every morning, and other occasional maintenance work is done throughout the dry season when the well is in use. After each rainy season the wells are cleaned. Flood water washes sand and dirt into the wells and erodes the walls of the ramp and the platform. New watering troughs must be constructed, the walls must be propped up and the fences surrounding the wells must be put in order.

It should thus be clear that a continuous and coordinated supply of labour is absolutely essential for the operation of a Borana well, both in the short and long run. This labour force is supplied by the users of the well, and constant participation

Figure 3

SCHEMATIC VIEW OF BORANA WELL



in the practical tasks of running the well is a necessary condition for the maintenance of watering rights. Another necessary condition is participation in the well council.

The most important task of the well council is to decide on the watering rota, which implies the allocation of watering rights. There are few explicit and formalized rules governing the allocation of such rights, but, with water a scarce resource and considering the very orderly fashion in which work at the wells is carried out, there must be mechanisms governing the allocation of rights and some powerful sanctions underlying the decisions of the well council.

In principle, or according to rules elicited from informants, a clansman of the *abba ela* cannot be excluded from the well or denied watering rights. But any watering rota will show that there are many users of a well who are not clansmen, and that clansmen of the *abba ela* are users of other wells in the same locality, belonging to other clans. Since the wells are known as belonging to specific clans, clan affiliation is obviously one important factor in gaining access to a well. The clan organization of the Borana, however, is cross-cut by other organizing principles, such as the *gada* system and the age-sets. Clans are also linked by marriage, friendship and alliance, and all these links are potentially legitimizing bases for claiming watering rights. Gaining access to a well depends on how successful a man is in presenting and defending his claims before the well council, which in turn depends primarily on what kind of support he is able to mobilize among the council members.

The meetings of the council are informal and anyone is free to attend. The same rules of conduct apply for the *cora ela* as for any other *cora*, being basically that any man present is free to voice his opinion. A Borana may not tell another Borana to keep quiet in such meetings. To do so would be a serious affront and bring about claims for compensation. Decisions in the *cora* are reached through the gradual formulation of consensus, not through any kind of voting procedures, but always with detailed reference to the *ada-sera Borana*.

The bonds of alliance a man calls upon to claim watering rights must be legitimized with reference to the *ada-sera*. It is important to note, however, that this concept of *ada-sera* is not static. Borana law is not clearly codified in rigid

bodies of rules and regulations, so there is considerable leeway for adaptations in particular situations. The concepts of legality and legitimacy in this context are sufficiently flexible to allow individual interpretations. In the context of the well council, this means that there will always be a number of cases that are at best doubtful. At first, they may be accepted though understood to be only marginally legitimate, but, given successful political tactics, these cases will over time become more and more safely entrenched in the rather fluid concept of *ada-sera*. The customs and laws of the Borana may thus, particularly in the context of water, be said to be what the *cora* decides they should be.

The tactics involved in these decisions are complex and require a great deal of covert negotiation and mobilization of support. How successful an individual is depends on several factors. Support in the well council must somehow be repaid, and the compensations a claimant (covertly) has to offer are important, whether they involve bribery, support in other contexts, the exchange of cattle, lending of labour or even political or religious expertise. In practical terms, this means that every user of the well must keep a watchful eye on the politics of the well council and on his own hard-won rights to water, to make sure that his rights are safely within the limits of what is understood to be legitimate at any given time.

Some implications of the organization of well use

Access to permanent water is a basic precondition for animal husbandry in Borana. Access to water, which is restricted, regulates access to pasture, which in principle is free but in practice is controlled by the availability of water. The Borana have a sophisticated system for the utilization and control of water, which has several important implications for the ecological balances involved in their adaptation to their environment.

Water utilization in Borana is labour intensive, with labour supplied by the users of a well in proportion to the number of animals watered. Thus, labour is not critical for herding, but very much so for watering. The labour required to herd one animal is sufficient to herd several, which means that within certain limits the number of animals in a herd may be allowed to grow without a directly proportional increase in labour requirements. But to water animals from a Borana

well, each extra animal requires an additional input of labour. This means that the availability of labour is a very important consideration in Borana livestock management and that herd growth presupposes an increase in the labour force.

There is a natural tendency for growth inherent in every herd and, as cattle numbers rise, labour becomes a constraint. Among the Borana, this dilemma is solved in several ways. Excess cattle, in this sense, are distributed to friends and allies, solving the problem of labour shortages in the management unit of the donor as well as strengthening relationships (see Baxter, 1970, particularly 120ff). Alternatively, a unit may try to bring in extra labour by borrowing herdsmen from other units through adoption and foster-parenthood, through herding contracts or even through clever manoeuvring in the well council. There are also cases where the *abba hirega* is bribed to admit cattle for watering even if the herd-owner does not provide sufficient labour.

It is clear, however, that these strategies will in the long run siphon off cattle from the herd, whether through bribery, herding contracts or relationships of friendship and alliance. Whether these strategies in the long run will lead to an overall reduction in herd size depends on the balance a herd-owner can strike between the natural growth of the herd and the price he has to pay for extra labour. Should these strategies fail, however, the herd size is ultimately and harshly regulated through increased mortality. If there is no labour available to water the stock, the excess cattle will simply die off until the herd size stabilizes at a point where labour and animals again are in balance.

The labour requirements for watering also involve another consideration. The physical structure of most wells implies that a labour force is required to draw even a single bucket of water which is larger than what any single management unit can supply. The wells thus force cooperation between different units. A stable and coordinated labour supply is also crucial to keep the wells functioning, and a breakdown of the relationship between the cooperating units is detrimental to everyone involved. The orderly resolution of conflict, immediate sanctions on physical violence, a commonly shared moral code epitomized in the *nagaya Borana* (the peace of the Borana) and cooperation between management units in maintaining and

using the wells may thus be regarded as interdependent and mutually reinforcing factors in Borana social organization.

CONCLUSION

Sustained pastoral production among the Borana depends on the balanced relationship between pasture, animals and people. This discussion has tried to show how the availability of water and the social control mechanisms regulating this scarce resource imply a control over stocking rates on the Borana range. Other features of Borana social organization impose strict rules on human reproduction. This can lead to a situation where manpower is in short supply in a society based on a labour-intensive economy.

The major sanction underlying the Borana system of water control is, of course, exclusion from water. Failure to supply labour to the well and failure to participate in the politics of the well council will lead to rapid exclusion. This participation depends on labour in proportion to livestock. Excess stock are ultimately removed by mortality, but before this stage is reached there are several social mechanisms for both dispersing cattle and mobilizing labour.

The basic contention here is that the Borana have achieved a well balanced ecological adaptation and that this balance is maintained by a complex social structure which is closely related to the regulation of access and utilization of the critical water resource. Under the traditional circumstances of Borana pastoralism, the organizational forms of Borana society thus constitute an adequate adaptation to the environment. This fact has important implications for planning development in the Borana area.

In technical terms, the pastoral resources of the Borana can easily be expanded by digging stockpounds or sinking boreholes. The sociological implications of this, however, are likely to be far-reaching. If water is made freely available, the existing social organization, which regulates labour inputs, access to water

and control over pasture, will be stripped of its major function.

At this stage, one can only predict that this loss of function will weaken the social controls of the existing system. If the social controls are weakened, one may further predict that the restrictions on human reproduction will be removed as the social system on which they rest disintegrates. Free reproduction and free access to water may be advantageous for the individual in the short run, but will have serious maladaptive implications. The short-term expansion of resources will be followed by long-term degradation.

Development inputs in this context should be designed to be accommodated within existing local control mechanisms. It must here be stressed that this cannot be achieved in a once-and-for-all blueprint fashion. On the contrary, development must include a component of continuous monitoring to ascertain how the local population adapts to innovations. As it may safely be assumed that these adaptations are not likely to be foreseen by the planners, no matter how skillful or imaginative they are, a development project in this area must be flexible enough to modify specific development inputs as information on desirable or undesirable trends becomes available.

8. KINSHIP AND CAMP STRUCTURE AMONG THE ISILOLO BORANA

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The Borana are an Oromo-speaking people who live in southern Ethiopia and northern Kenya. This paper deals in particular with the cattle-owning Borana (Borana Gutu) of Isiolo District in Kenya, the descendants of a group which fled from southern Ethiopia in the late 19th century during the expansion of the Ethiopian empire. As of 1969, they numbered about 16 000, according to the Kenya population census. Unlike their relatives further north, the Isiolo Borana are Muslims: they converted to Islam in a process closely paralleling the growing involvement of their elite in commercial cattle trade and the colonial administration.

While the mainstay of the Isiolo Borana economy is cattle production, and to a certain extent small stock and camels, the effects of the Somali secessionist war in northern Kenya in the 1960s and subsequent drought forced the Borana to diversify, for instance by sending household members away from the area to work as policemen or soldiers or by cultivating small plots under irrigation. Although a number of individuals are engaged in these activities, most Borana families still live in traditional pastoral camps (*ola*).

A Borana camp consists of a number of cooperating homesteads. At first sight, a camp may appear to include a random collection of related and unrelated people, with no single dominant principle of recruitment. However, the people who come together in a camp are rarely strangers: they may be linked by kinship or marriage or adoption of orphaned children in the past. They are likely to have camped together before, or their parents may have camped together. Although

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Asmarom (1973:32) described a Borana camp as 'an unstable grouping of families who have settled together for the duration of a season', observations over a longer period reveal considerable continuity in camp composition. When strangers do join a camp, they are usually migrants from Ethiopia who have decided to move permanently to the Isiolo area to escape drought, poverty or various personal problems.

Most people are welcome to join a camp unless they are known to be uncooperative or lazy. Such individuals may not be allowed to join even if they are close relatives of the camp members, while unrelated people may be welcomed if they are known as industrious and peaceful. However, newcomers may not be allowed to join a camp if there are already too many cattle in the area, and sometimes camp members are even asked to leave in a situation of overstocking, although this is considered in bad taste (see Baxter, 1966:119).

Otherwise, there is strong social pressure on all homesteads to stay with a camp. A household head may settle with another camp temporarily or permanently because of marriage or an urgent request from a close relative, but it is seen as unfortunate if a camp splits (*gargar godana*) due to divergent opinions on grazing or migration strategies. A man who stubbornly wants to go his own way will not be welcomed back to the same camp later on, though he is free to settle in a nearby camp. If the herds of his former companions fare better than his own, he suffers a severe loss of prestige, while if his animals fare better he may gain some prestige, but this will not necessarily recommend him as a camp mate.

THE BORANA HOMESTEAD

A Borana cattle camp generally comprises from 10 to 40 homesteads. Each homestead consists of a herd-owner, his wife or wives and their unmarried children. Frequently, this core household also includes aged female dependents, orphaned adolescents and stockless clients employed as herdsmen. In addition, married sons and daughters often continue to live for some time with their parents, and brothers

may continue to live together after the death of their father. Each adult woman in a homestead builds her own hut where she lives with her children.

Cattle holdings

In principle, cattle are not owned by individuals in absolute terms. Rather, they are considered family capital, entrusted to men over their lifetime and ultimately handed down to future generations. The family as a group is responsible for providing each grown man with at least a nuclear breeding herd if possible, and the family retains some voice in his husbandry decisions.

A Borana father begins giving animals to his children when they are still young, as a kind of anticipated inheritance. These animals (*gahawa*) and their offspring make up the nuclear breeding herds from which the sons build up their future livestock holdings. Many of these gifts are customarily prescribed on important occasions, such as circumcision or name-giving. Others are given when the father wishes, often in a playful context as a reward for a child's accomplishment, such as when a boy has killed his first two mice. If the animals acquired by a boy during his childhood multiply at a normal rate, they should be sufficient for him to form a subsistence herd when he reaches his twenties (Dahl and Hjort, 1976: 71ff). However, losses in the early stages of development may delay the growth of his herd considerably. A father is meant to make up for such losses and to correct imbalances if the herds of his sons grow at different rates, but this is often difficult for present-day herd-owners in Isiolo District because of the cattle scarcity due to the Somali secessionist war and subsequent drought.

When a father dies, he usually has a number of cattle which have not yet been allocated to any of his children. According to Borana tradition, these animals are all inherited by the eldest son (*angafa*), who is then responsible for providing his younger brothers with breeding herds. The Isiolo Borana, however, follow the Moslem inheritance rules, sharing a father's cattle equally among his sons and also occasionally allotting a number of animals to his daughters. When daughters marry, they do not take their animals with them, but they are free to choose how they wish

to distribute them among their brothers.

In spite of changes in the inheritance rules, an elder brother still assumes a paternal role over his younger brothers and sisters. He is taught from an early age to think of himself as his father's representative and closest confidant. As a child, he is most frequently asked to carry out tasks which involve contacts outside the household, and he is encouraged to feel a special responsibility for the family cattle holdings. He is also given authority to delegate tasks to his younger brothers. At his father's death, the oldest son inherits his spear and the best bull or buck of every livestock species in the family herd. He has authority over the management of his brothers' animals until they marry.

If a father dies before his sons are adults, his children and livestock come under the protection of his brother, who usually marries the widow. Although ideally in such a situation the uncle's relationship to his nephews should be that of a father and son, in practice there is ample room for conflict. The marriage with the widow also often ends in a quarrel, and the woman often returns to her own family, leaving her children with their uncle. A widow might also choose to take her children and move in with more distant relatives or clanmates of her deceased husband. As she is with her husband's clanmates, her children may stay with her, and conflicts over the children's inheritance are less likely. In fact, the clanmates may support the children's claims against their uncle.

Herd management

Among the Borana, milking and the use of milk are the responsibility of women, while the care and management of the animals is largely the responsibility of men. Cattle husbandry can be broken down into two levels of responsibility: the day-to-day care and movement of animals to water and grazing, and long-term planning and management, involving decisions on herd composition, the acquisition of new animals and offtake from the herd by slaughter, sale or gifts. The first area of responsibility corresponds with Paine's (1964) concept of herding, while the second corresponds with what he calls husbandry.

A man cannot possibly manage his herds successfully without a son, younger brother or client who can actually herd the animals on a daily basis, leaving the owner free to visit other camps, wells, markets and administrative centres to meet with other herd-owners and gather information on pastures, water, weather conditions, disease incidence and other factors which must be taken into account in planning a herding strategy (Stenning, 1966: 104ff). A son begins to help his father with herding at the age of 10. At this time, he begins to take a special interest in his own animals, but his father still controls their management. The father may give his son's animals away or sell them as he feels necessary, but he is not free to reallocate them within the family.

After a man's first marriage, he is meant to behave as an adult and voice his opinions in discussions of communal affairs. His rights over the cattle which have been allotted to him are expanded at this time, but he still cannot manage his animals independently. Marriage is only the first step in developing the necessary junior labour which will allow a man the freedom to plan the management of his herd and thus to establish his own homestead. The period required to reach this position depends on the life cycle of the family and also on whether a man accumulates enough cattle to support dependents: a fully independent homestead must have enough cattle to provide the subsistence needs of the family and enough family members and herdsmen to look after the cattle on a day-to-day basis and plan longer-term herding strategies.

While a young married man may assume herding responsibilities and establish a separate homestead, the ultimate authority to make husbandry decisions rests with the father until his death. An old man may delegate responsibility for cattle husbandry to his son, but, at least in theory, he may withdraw this responsibility at any time. In practice, a grown man may be able to challenge his father's authority, however, particularly over animals he has acquired on his own. According to Paine (1964: 96), 'Adult status is obtained when a child is able to deny his parents the right to castrate or slaughter an animal bearing his mark'

THE BORANA CAMP

Layout

Normally, when security measures are not pressing, a Borana camp consists of huts built in a semicircular row on the windward side of the cattle pens. Borana clans are divided at the broadest level into two groups, called moieties, the Gona and the Sabbu. All marriages are between members of the opposite moiety, and a wife takes her husband's moiety when she marries. The homesteads of families in the Gona moiety are generally found on the right side of the camp, as this moiety is considered senior in terms of Borana ritual. The homesteads of families in the Sabbu moiety tend to be on the left.

The homestead of the *abba ola*, the father of the camp, is usually at the extreme right. Otherwise the Isiolo Borana do not appear to order their homesteads within a camp in terms of seniority, either based on age or generation class (*luba*). However, Asmarom (1973:36) claims that among the northern Borana, the *abba ola's* hut is at the extreme left and that all huts are ordered according to seniority, but he does not specify the basis for seniority. In Isiolo, informants mention that among the northern Borana the huts of men who have reached the senior generation class are built at the right end of a camp.

In practice, rules concerning camp layout are often compromised. For instance, newcomers should be fully integrated into the camp structure with their moiety groups, but if space between the older huts is not adequate the more recent arrivals may all be placed at one end of the camp. If there are already a number of Gona homesteads at the right of the camp, the position of newly arrived Gona families is not considered important. A person may also arrive at the camp who is in some way senior to the *abba ola*, and his hut may or may not then be placed at the extreme right.

Cooperation and leadership

Living in a large camp has distinct advantages for the individual homestead as long as there is sufficient grass in the vicinity to feed the cattle of all the camp members. A camp provides enhanced security against raiders and the pleasure of social interaction, but above all it creates an opportunity for pooling milk, meat and labour. Young people are lent out among households, and women cooperate in building huts and looking after children. Milking lends itself less easily to cooperation, because it involves a personal relationship between the milker and the cow. Among men, information on grazing conditions is discussed, group decisions are taken (*mala marri*) and herding and watering are carried out on a cooperative basis. The cattle of different homesteads are penned separately at night, but they are generally driven out to pasture together. They may be divided into separate herds while grazing, but the herds are grazed near each other so that cooperation is possible for watering or in an emergency.

The Borana also consciously use recreational activities to integrate newcomers in a camp. Teams are formed, based on the Gona and Sabbu moieties, for ball games, singing contests and mouse or squirrel hunting competitions.

The *abba ola* has final responsibility for the welfare of the cattle in his camp, though he exercises no ritual or religious leadership. His role is based more on influence than power, as most decisions are taken jointly. Herd movements, for instance, are decided by a camp council consisting of the heads of homesteads but led by the *abba ola*. As grazing conditions deteriorate around a camp, the herd-owners send out scouts to look for new areas or to locate the first rains at the end of the dry season. The *abba ola*'s formal authority is limited chiefly to granting permission to join or leave the camp, though considerable prestige is attached to his position in a large camp. He assigns herding tasks to the younger members of the camp and settles minor disputes. More serious quarrels, however, are taken to the government-appointed Chiefs.

The substantial labour involved in watering stock and maintaining a well makes cooperation in this area a necessity. A well is generally used and maintained by the

father of the well (*abba eLa*) and the members of his camp (see Baxter, 1954: 124 and Helland, in this report). The *abba eLa* is the man who organized the digging of the well or his direct descendant. This position carries with it considerable prestige and economic importance (Haberland, 1963: 32), and an *abba eLa* is often, though not always, also the father of the camp. However, the rights to a well are to a great extent based on current maintenance and use, and formal ownership tends to be forgotten if an *abba eLa* moves away, unless his relatives stay and maintain the well. In the long run, a permanent well is likely to come to belong to a clan or lineage segment. Members of different camps may be allowed to use a well if they help with its maintenance: watering schedules and maintenance work are organized by the *abba eLa* in discussions with the leaders of the camps using the well.

Leadership in a Borana camp is to some extent based on seniority, in terms of age or generation class, but it is more often a question of influence. A man whose herds supply more than the subsistence needs of his immediate family can attract support through the distribution of food and animals. In this sense a wealthy cattle-owner can build up personal power from a number of informal links with people who owe him loyalty in return for gifts of food and other assistance. This social asset is the main advantage of a wealthy man: in terms of material standards he will not live very differently from other Borana. Thus the redistribution of food is an important social transaction which goes beyond an insurance investment or an adjustment to storage difficulties. Baxter (1954: 230) points out that milk is often given out secretly, since such gifts imply that the receiver is a client. The wealthy man attracts overt clients, such as widows and orphans, and also others who join his camp in the expectation that they are more likely to receive support than to be asked for support themselves. Such a man is likely to become the *abba oLa* of a camp.

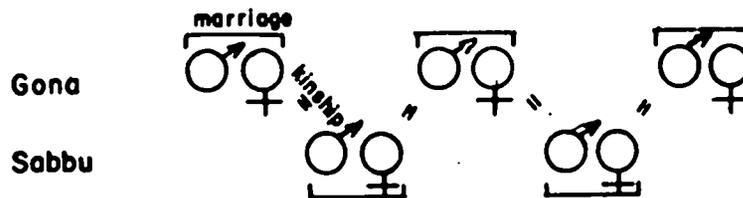
PATTERNS OF CAMP AFFILIATION

The camps observed in the Isiolo area consist largely of extended chains of homesteads linked by marriage. This pattern was identified among the northern

Borana by Asmarom (1973: 35) as 'bilateral joint family chains'. He depicted the chains graphically as follows:



As Borana marry into the opposite moiety, all members of that moiety are regarded as potential in-laws, or *sodda*. Taking moiety affiliation into account, the chain of marriages linking members of a Borana camp resembles a snake:



Kinship

There are important reasons for individual herd-owners to leave their relatives and join camps with their in-laws in some cases or to stay with their own families in others. When animal numbers are substantial, grazing resources are best utilized and risk kept to a minimum if the herds of individual family members are separated. In addition, herd-owners gain access to a wider network of information by living with chains of households linked by marriage, rather than by confining their contacts to their own relatives. As Gulliver writes about the Turkana (1955: 164):

Personal susceptibilities apart, as they see it, the total herds of a group of related men are best cared for by their dispersal over the country, each unit taking advantage of local conditions and the whole not jeopardized by any single calamity.

For this reason, fathers and grown sons or brothers are not necessarily found living together in the same camp among the Isiolo Borana. As Asmarom describes the situation (1973: 34), 'Patrilineal descent is neither the exclusive nor the dominant structural feature bringing kinsmen together in the camp.'

When a variety of species is kept, their different requirements constitute an additional factor favouring the dispersal of a family's livestock holdings. According to Baxter (1954: 120), the Borana in Kenya's Marsabit District divide their stock into five categories - lactating cows, dry cows, lactating camels, dry camels and sheep and goats. Most Borana families in this area keep all types of stock, with each adult male responsible for one category, based on his status in the family. Generally speaking, the Borana around Isiolo keep only a few pack camels and graze their cattle and small stock together. However, even when only one species of livestock is kept, it is considered good management to split up a large herd.

Camps composed of adult brothers, like camps which include a father and his adult sons, often 'represent a temporary arrangement that endures while the younger brothers are waiting for the division of the family estate' (Asmarom, 1973: 34). The Borana admire the principle of fraternal unity and believe that ideally brothers should continue to live together after their father's death and keep their patrimony intact. In this way, they also preserve their father's name, because a camp of brothers living together is called 'the camp of the sons of X'. In fact, relations between brothers are often tense. Conflicts over herd management may arise during the period when an elder brother has authority over his younger unmarried brothers' animals. He may, for example, tend to choose their animals for slaughter, rather than his own. Disputes over actual or claimed mismanagement are frequent.

A widespread complaint is that fraternal bonds have deteriorated in recent times, but, given the limited information available, it is difficult to know whether such complaints have increased in recent years due to the change in the rules of inheritance or whether they have been voiced for centuries. It is clear, however, that the traditional inheritance system did not necessarily ensure fraternal peace (see Asmarom, 1973: 25). Younger brothers were dependent on the good will of their elder brother because there were no formal rules for the support he was supposed to give them after their father died. According to Moslem laws, younger brothers are less dependent on their elder brother, but, on the other hand, he has less responsibility for their wellbeing. In either situation, when a father dies before allotting a sufficient herd to each of his sons, the younger ones risk receiving less

than their fair share of the family livestock.

Around Isiolo, many livestock holdings were drastically reduced during the 1960s, and brothers did not inherit enough cattle to provide subsistence for separate homesteads. Thus, the entire inheritance is frequently kept together under the authority of the elder brother, while a second brother takes up small-scale agriculture and the younger ones look for employment as herdsmen, watchmen or in the police force. A family with sufficient wealth may also invest in a shop or a building in town which can be let out, and one brother might be sent to school in the hope of making a career in government administration. Men who are working outside the area leave their wives and children in the camp to look after their interest in the family herd. As a consequence, a Borana camp frequently includes a number of households whose male heads are absent. This pattern, while a response to modern economic conditions, also reflects the tradition of diversifying productive activities in order to minimize risk. If the pastoral economy were more self-sufficient, one would expect brothers to separate sooner with their own herds and to join camps with their in-laws or others.

Marriage

While close kinship among the Borana is often not the ideal basis on which to build cooperation in herd production activities, relationships with in-laws serve both as a means of creating cooperation and of formalizing close friendships. The Borana term *sodda* is perhaps best translated as 'friend in-law'. It may be used to refer to in-laws in the strictest sense or it may be extended in certain situations to refer to all members of clans into which one's own clan is married or even to all members of the opposite moiety.

The use of the term *sodda* always connotes alliance and affection, as illustrated in a number of Borana proverbs: *bar china soddat walin bahi* - last season, when everyone separated, the in-laws stayed together; *obbole dowe, sodda dowe dadabe* - you can refuse your brother, but never your in-law; or *lubu dossa reban* - you chase away the death of your in-law. Borana often express

the view that the *sodda* relationship is of fundamental value to their culture. One man, for instance, complaining about the decadence of modern times, explained:

Everything has changed, and we lack water. There is no respect for women, brothers or old people. The only people remaining that are given respect are the *sodda*. That is a thing which will never change. It can't stop. Brothers-in-law are not like your own brothers. They are better.

The concept of balanced opposition is central to Borana thought, and the *sodda* relationship in principle is considered reciprocal and equal. This is in contrast to the situation among neighbouring or closely related groups, such as the Nilotic Turkana (Gulliver, 1955: 205), the Gabra or the agricultural Oroma of Shoa (see Torry, 1976: 273 and Blackhurst, 1974: 291), who consider the wife's relatives superior to the husband's. Among the Borana, it is felt that two brothers should not marry sisters, or even girls from the same subclan, while the marriage of two men from opposite moieties to each other's sisters is considered a very favourable arrangement. This might reflect some notion of maintaining balance.

Residence with a father-in-law. In general, the rules concerning forms of address and children's behaviour towards their parents are extended to parents-in-law. Daughters-in-law are treated just like daughters and sons-in-law have the same relationship with their fathers-in-law as they do with their own fathers. The exception is the relationship between a man and his mother-in-law, which is marked by complete avoidance, especially at the beginning of a marriage (Baxter, 1954: 213). The ambiguity of the mother-in-law's position often found in patrilineal societies is intensified by the Borana moiety system which implies the classification of a mother-in-law as both an affinal and a quasi-agnatic relative.

Informants among the Isiolo Borana claim that traditionally a newly married couple only stayed with the wife's parents for a short time: ideally, they would leave on the seventh day after the wedding. A man who had no sons, however, might ask his son-in-law to stay with him to provide labour (see Goody, 1973: 39). In this situation, the young husband would normally prefer not to stay himself, but would provide his father-in-law with an employee, a young unmarried man (*kero*) who was paid one cow for one year's work. This practice seems to be uncommon today, however, probably due to the general shortage of cattle in the area.

When a girl marries at an early age, she and her husband might live with her parents for up to a year while she continues her domestic education. There is no formal limit among the Borana on the youngest age at which a girl can marry, although marriage is not consummated until puberty. Several older female informants said they had married at the age of 7 or even younger. Such early marriages are not common among the Isiolo Borana today, however, but girls frequently marry when they are 13 or 14. At this age, they may not yet have learned how to build a hut or acquired other domestic skills. It is felt they should be taught these things by their mothers: if they were taught by their mothers-in-law, the situation would create tension.

It is now common for a young married couple to live for an extended period with the wife's parents while the husband works looking after the herds of his father-in-law. This situation is not considered quite proper, however, as it reflects badly on the economic status of the young man and his family, apparently because it implies that they cannot afford to pay a *kero*. If the son-in-law agrees to perform this labour, the brideprice is also often lowered. If the bride's father wishes to gain a foothold outside the pastoral economy, he might send his own son away to take up employment and keep his son-in-law as a herdsman. It is considered a serious breach of behaviour for the young man to leave against the wishes of his father-in-law, requiring a peace settlement by the clan elders.

Residence with a brother-in-law. Among the Borana, the double link between a brother and sister and between the brother and his sister's husband seems to provide an ideal basis for cooperation in a camp. As already mentioned, Borana cattle camps are frequently composed of chains of sibling groups linked together in this way. This arrangement has none of the negative implications of living with a father-in-law. Gulliver's (1955: 206) description of the relationship between brothers-in-law among the Turkana applies equally well to the Borana:

With his wife's brother or sister's husband, once the marriage has become well established after a few years, a man often maintains extremely cordial relations of a practical equality, equivalent indeed to fraternity with none of the latent tensions that are involved in real brotherhood. A brother-in-law is pre-eminently a person whom one can trust and rely upon, even to the extent of allowing him temporary control over one's herd. There is commonly considerable affection between the pair of men, and this relationship is one of the most valued among these people. There is not the difficulty of superiority and age difference as with a father in law, nor of tension and rivalry as with an agnate. The two men are often of the same generation, about the same stage of personal development, and with similar but not competing interests and problems. There is in addition the strong emotional bond via the sister-wife.

As Gulliver implies, an important basis for friendship between brothers-in-law appears to be the strong bond between brother and sister. In a society where the privileges and duties of boys and girls overlap very little, there is less occasion for conflict between a brother and a sister than between two brothers. When a brother and sister are approximately the same age, the bond between them is further strengthened by the fact that the girl will probably look for a husband from among her brother's friends. Since most girls prefer to marry men from their own age group, a sister may also enlist her brother's support if she wishes to refuse the proposal of an older man. In principle, Moslem law requires a woman's consent to marriage, but in many cases women are pressured or forced to marry against their will, especially when a suitor is particularly influential or wealthy.

Relationships between young men and women before marriage are strictly limited among the Borana, so a prospective suitor often courts a girl's brother, while showing special respect for her father, because he cannot court her directly. A brother may be instrumental in persuading his sister to accept a particular suitor, and marriage often serves to formalize an already existing friendship. Thus a man may continue to live with his brother-in-law after he is divorced or his wife dies and may even prolong the *sodda* relationship by marrying one of his ex-wife's sisters.

Borana women continue to maintain close ties with their brothers after marriage, often living in the same camp or visiting back and forth if they live in different camps. Even middle-aged women who moved to Isiolo District years ago from southern Ethiopia try to visit their families in the north every few years. A married sister will also turn to her brother when she needs support, and if she is widowed and does not wish to remain with her husband's relatives, she is likely to return to her brother's household (see Rigby, 1969: 27). Similarly, a wife's relatives are considered reliable custodians of her husband's cattle, since 'they would never spoil the cattle of their sister'.

The close ties between in-laws are based on the bond between brothers and sisters and on friendship and mutual interest rather than on the exchange of bride-wealth. Bridewealth among the Borana is relatively small, and Asmarom (1973: 32-37) seems to infer from this that relationships among in-laws are not important, though this implication is certainly not supported by the present study. Traditionally, bride-wealth among the Borana was made up of two parts: the obligatory *karata*, consisting of two bulls and one or two heifers, and the *gabaar*, negotiated according to the wealth of the groom. A number of sheep and goats might also be transferred at an earlier stage of courtship (Asmarom, 1973: 32). The transfer of the *karata* conferred rights over all of a woman's future offspring: her children would belong to the clan of the man who first paid *karata* regardless of whether they were born before or after her husband's death or who was the biological father.

Among Moslem Borana, the *karata* may be replaced by the promise of a gift (*meher*), to be given to a wife in case of divorce or her husband's death. The *meher*, which consists of about K Shs 200 in cash, a certain amount of cloth and perhaps one or two cows, confers only temporary rights over a woman's reproductive capacity: all children born over the duration of the marriage become the husband's legal heirs and members of his clan. A groom may also pay *gabaar*, depending on his wealth: as of 1974, four animals were often given, as in the traditional *karata*, and a reasonable upper limit for a wealthy family was about 10. Apparently, before the Somali secessionist war *gabaar* payments were as high as 30 to 40 cattle. Although the cattle obtained by a woman's family when she marries are not earmarked for use as bridewealth by a particular brother, an animal is usually given to one of her brothers.

Special assistance from in-laws. In-laws are important sources of material support in certain situations. Within a camp, they frequently exchange food on a day-to-day basis, and, as mentioned, a brother-in-law is considered an ideal custodian for a man's cattle. A polygynist may place his different wives with herds or flocks in the camps of their brothers, thus increasing the number of alliances he may call upon in times of stress, spreading his own risks and possibly achieving some diversification among his livestock holdings.

When a man is declared destitute through no fault of his own, he is entitled to receive stock from his own clan, and his in-laws are also expected to give him animals without being asked. Though specific information was not obtained on which in-laws actually give cattle in such a situation and on how many animals they give, informants generally agree that gifts from in-laws usually make up a substantial proportion of a destitute man's new breeding herd.

A herd-owner might also find himself 'surrounded by dry stock' (*gua ta harka qab*), which means that his herd is in principle large enough to provide his subsistence but at the moment he does not have enough cows in milk. A man in this position may ask for a *dabarre* cow from a relative, a friend or an in-law, but only an in-law is actually required to help in this situation. A man who receives a

dabarre animal becomes obligated to the donor in a general sense, but he may not necessarily reciprocate in terms of livestock. If his herd recovers well, he may choose to return the cattle received, along with additional animals (*galatho*) to show his gratitude. If the donor later finds himself without sufficient cows in milk, he may ask for any female offspring of the cow he gave, but the original cow and any male offspring are considered the property of the original recipient.

Clans and generation classes

Borana clans do not coincide strictly with territorial units, as they do among the Nuer or the Somali, so that a household may find clanmates distributed over a wide area. However, clans do not appear to be spread evenly over Borana territory, which implies that individual clans have developed some territorial basis. A number of the clans mentioned by Baxter (1954), Asmarom (1973: 40) and Haberland (1963: 123) are missing in Isiolo. The Borana like to live near the influential elders of their clans, particularly if the elders serve as links to government administration, but they need not live in the same camp. Thus members of certain clans may be found concentrated in particular areas, though members of other clans are always present as well: in Isiolo District, the Borana can speak of a Digalu area at Merti, a concentration of Karayu and Warra Jidda at Garba Tula, and a number of Dambitu, Nonitu and Danka or Didimtu Karayu at Sericho.

Because the Borana do not fight internal wars, different clans and segments of clans are not hostile to each other, which gives an individual Borana greater flexibility in calling on clan affiliation for different types of support. Thus in Isiolo District where the Borana population is not dense, cooperation may be based on affiliation with the Digalu or Mattari clan, while in the central Borana territory a similar level of cooperation would occur between members of subsections of clans, such as the Mattari Meta or the Digalu Emeji.

Among the Borana, membership in a camp is based on free alliances and day-to-day cooperation, rather than on clan affiliation. This contrasts with the situation among the Samburu, where residence patterns are clearly based on clan affiliation

and an elaborate system of livestock exchange also links members of the same clan. When clanmates are found living together among the Borana, it is frequently because clan members have taken custody of the children and livestock of a man who died and did not have brothers. Also, if a man wishes to move into a new area where he has no other connections, he may base his request to join a camp on clan affiliation. Clan affiliation might be referred to in order to legitimize a relationship which is, in fact, based on other links.

There are fewer grounds for conflict among clanmates than among brothers because property is not held in common. Also, there is no need to disperse the holdings of clanmates in order to reduce risks. Clanmates might be brought together because the rights to certain wells are vested in clans, but this is not likely to be an important factor because the clans' rights to wells are not exclusive.

The clan is responsible for distributing stock to destitutes (*golle*), for supporting widows and orphans and, more rarely, for collecting or distributing compensation in cases of violent crime. In such situations, the clan elders decide on the number of stock to be contributed by individual clan members. If a clan member does not have enough cattle to meet certain obligations, such as bridewealth payments, he may also be assisted by other clan members on an individual basis. Thus a man receives cattle from his clanmates to build up a breeding herd or to fulfill social obligations: by contrast, he asks for and receives milk cattle from his wife's family. According to Baxter (1966: 125), a man does not ask for cattle from his clanmates 'except for entertainment'.

The *gada* system, which divides the Borana population into generation classes, or *luba*, is described by Helland in this report. This striking feature of Borana social organization has also been described by Haberland (1963: 167-273), Asmarom (1973) and Baxter (1954). Every man is admitted to a *luba* based on the *luba* of his father, while women assume the *luba* of their husbands. All Borana patrilineal descent lines are affiliated with one of five geneological chains, or *gogessa*. A new *luba* is opened in one of the *gogessa* every 8 years. Thus sons are admitted when a new *luba* is opened in their fathers' *gogessa*, or 40 years

after the opening of their fathers' *luba*.

Although both *gogessa* and clan affiliation are inherited patrilineally, authorities such as Knutsson (1967: 195) and Baxter (1954: 284) agree that the two systems are independent of each other and both crosscut territorial divisions. Like the clans, however, the *luba* appear to be concentrated to some extent in certain areas. For instance, the Bule Dabasa *luba* seem to be heavily over-represented in the Garba Tula/Kinna area. This can be partly explained by the preference for marriage within the same *gogessa*. The fathers of the present Bule Dabasa generation came down to the Isiolo area together from Ethiopia at the turn of the century and tended to marry within the same *luba*, so their children today also tend to belong to the same *luba*.

Little is known about the territorial bases of the various Borana social groupings. Development planners in Ethiopia (Ethiopia, 1974:25ff) identified two territorial units larger than the traditional cattle camp, the *deda* and the *rera* or *arda*. The *deda* was described as a more-or-less permanent grazing area up to 20 km², and including on average about 38 camps. The *rera* or *arda* was a group of about eight neighbouring camps. Borana informants in Isiolo identify people with specific areas, with statements such as 'these are Sericho people'. They perceive the district as divided into at least two areas, with slight differences in dress and dominated by different Moslem sects (*tariqas*).

SUMMARY AND CONCLUSIONS

This chapter has described some of the main features of Borana cattle camps in Kenya's Isiolo District, with particular stress on the factors determining the affiliation of individual homesteads to particular camps. When relationships within a camp are considered closely, in most cases recruitment appears to be based on one of four factors. First, members of a family may temporarily hold joint interest in the same herd. This would be the case when adult sons or brothers have not yet

divided up their inherited livestock. In Isiolo, where cattle are relatively scarce at present, a family holding may not be sufficient to provide each brother with a viable subsistence herd: in this case the men might keep their animals together for an extended period.

Secondly, a young married couple might join a camp with the bride's father so that the girl can continue her domestic education with her mother or the young man can work for his father-in-law as a herdsman. As in the first case, this situation is likely to be found more often now than in the past due to the shortage of cattle: traditionally, the groom would have preferred to hire a young unmarried man to help his father-in-law.

Thirdly, clanmates may be found in the same camp, particularly when orphans have been adopted by members of their fathers' clan. A widow sometimes takes her children to live with her husband's clanmates to avoid the tradition of remarrying her husband's brother. In other cases, strangers from another area may refer to clan affiliation as a basis for joining a camp, or clan membership may be mentioned to describe a relationship which is actually based on other links.

Finally, a common and generally successful basis for sharing a camp is the relationship between brothers-in-law. In some cases, this link appears to emerge after a woman marries, based on her relationship with her husband and her continuing bond with her brother; in other cases, a previous friendship between two men may be confirmed when one of them marries the other's sister.

Of all these relationships, the link between members of the same family is most liable to stress. This is due to the potential for disagreement on the management and allocation of shared livestock. Conflicts over labour allocation, grazing strategies or personal factors may arise within any of these relationships, but it is considered a serious matter for a household to leave a camp because of such a problem. If a household does leave one camp, one of the same four factors will serve as the basis for joining another.

9. LABOUR REQUIREMENTS AMONG THE GABRA

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U S A

INTRODUCTION

Haaland's introduction to this report deals with development issues which apply in varying degrees to a wide spectrum of eastern African pastoral populations. Still, cattle economies dominate his analysis, and probably for good reason in view of the marketability of cattle and the preference for this species among many sub-Saharan herding societies. The Gabra, however, are East African pastoralists who keep cattle and large numbers of small stock, but whose economy is oriented above all else towards camels. The importance of camels in Gabra social and economic life stands in marked contrast to the negligible value these animals command in the national marketing system. Hence, governments have made little effort to encourage improved breeding or herd management.

The Gabra do not cultivate, and even if they were so inclined, the poor soils and overall aridity of their territory in northern Kenya would prohibit commercial farming outside a few locations. Their neighbours, the Borana, Samburu, Rendille and Somali, are also exclusively herding societies who lack agricultural and marketing knowledge which otherwise the Gabra might absorb. In addition, because the Gabra's form of multi-species stock management is highly labour intensive, few able-bodied individuals are free from herding work over long intervals to take up other pursuits. The analysis of contrasts between the Gabra and cattle-oriented societies will be restricted in this discussion to one aspect - labour requirements, as they are affected by ecological conditions and institutional factors.

LAND AND WATER RESOURCES

In 1970, the Gabra population numbered approximately 20 000, dispersed

over about 20 000 km² in northern Kenya and southern Ethiopia. Three-quarters of the country occupied by these Borana-speaking people lie in Marsabit District of Kenya's Eastern Province; the remainder lies south and west of Megado in the extreme southwest of Ethiopia's Sidamo Province. The Gabra move freely across the international boundary.

In this area, land use is severely limited by a scarcity of permanent water. Lake Turkana borders the area on the west, but herds are seldom taken to the lake because lava flows hinder access and the water is saline. Furthermore, the territory occupied by the Gabra's most dreaded neighbour, the Dassenitch, lies just to the north. A few major drainage lines which flow south through the middle of Gabra territory provide a little permanent water. Most wells and springs that issue from these sources appear beneath the Megado escarpment, between Dukana and Lake Turkana, and along the fringes of the 300-km catchment sump of the Chalbi internal drainage system. Springs originating in the Marsabit foothills release very limited permanent water.

Approximately 70% of Gabra territory is plains, at an elevation of 600 to 900 m, dotted with hills up to 1500 m. Soils are predominantly loams, clays and sands. The terrain is very rugged: extensive gravel patches, sand dunes, volcanic craters and massive lava rubble fields are common.

The plains and low foothills receive 100 to 200 mm of rainfall annually, while up to 350 mm fall on the higher hills. Rainfall tends to occur with the south-east monsoon of March to May and the northeast monsoon of October to December, but often the rains fail altogether. An annual potential evaporation rate of at least 1600 mm also contributes to the overall aridity of the lowlands.

Permanent water points are distributed very unevenly. The entire eastern side of the Hurri hills, stretching from Marsabit north to Arbale in Ethiopia over an area of some 6 500 km², contains only seven or eight dry-season water complexes. Without rain, enormous tracts remain virtually waterless, most notably the Dida Galgallo grasslands covering an area of about 3000 km². Adjacent water

points are commonly separated by distances of about 30 km. Some of the finest cattle rangelands, including most of the Hurri and Charigashi hills, have no dry-season water. With low annual rainfall, high evaporation, no rivers or fresh-water lakes, widely and unevenly spaced drainage lines, low surface soil water retention and very deep or negligible subsurface water, herd production throughout the Gabra area is strictly limited by water availability.

LIVESTOCK

Cattle are perhaps the Gabra's most productive livestock. On aggregate, they yield 20% more meat and 3% more milk than camels and their milk has a higher butterfat content. They also reproduce almost twice as rapidly as camels, and their tendency to aggregate rather than disperse when foraging makes them easier to manage. They are more tolerant of extremes in ambient temperature and less vulnerable to tick-borne diseases. Their horns are fashioned into utensils and their meat, skins and milk have market value. For all of these reasons, most Gabra would like to have larger cattle holdings. However, only one-fifth or less of their territory has sufficient water and pasture to support cattle populations during long and frequent dry spells. Throughout much of the year, the Gabra must send most of their cattle to a few well-watered highland areas, far from the hot plains occupied by their browsing stock.

Camels, which provide 60% of the Gabra dry-season milk supply, prefer the heat and small shrubs of the interior plains, where most of them are kept throughout the year. Sheep and goat flocks thrive in areas which are too dry for large cattle herds and also lack sufficient browse and water to sustain large numbers of camels. These tracts are transected by networks of water-yielding washes and small springs between Chalbi and Lake Turkana. As the dry seasons advance, the Gabra keep most of their small stock here, rather than driving them to the hills or central plains where the cattle and camels flourish. They claim that the tick-infested thickets and lower temperatures of the hill areas cause increased disease problems among small stock. Furthermore, large concentrations of sheep and

goats cannot be kept near the main camps, where camels are kept during the dry season, because of the limited forage supply and in many cases the long distances to water. With the various needs of different livestock species and diverse water and pasture conditions, herds must be managed by a system of multiple, mobile and dispersed settlements.

The Gabra divide their stock among main and satellite camps for the duration of the dry season. Primitive wind screen enclosures shelter the residents of satellite camps, or *fora*. The main camps consist of portable skin and sisal mat tents which are loaded on pack camels when the camps move. Each tent is ideally occupied by one nuclear family, or household, while a homestead consists of one or more households belonging to a man and possibly to his married brothers and/or father. A survey of 30 camps indicated an average of 14 homesteads in each, ranging from 5 to 34. Homestead members occupy adjacent tents, pen their stock together and share herding duties. In short, the homestead comprises a discrete stock production unit. The main camps surveyed moved on average 12 times during the dry season, covering from 65 to 145 km; the satellite camps were much more mobile. The Gabra bring their herds back together and move closer to the hills at the beginning of the rains.

LABOUR REQUIREMENTS

Multispecies herd management in dry environments imposes demands on labour surpassed by few, if any, other types of subsistence regime. Labour constraints warrant careful investigation, for work is a basic link between the biological needs of the herds and the social requirements of the herders. Energy has provided anthropologists with one index of work input, though this was not used for the study reported here. Several studies have inadvertently revealed that calorific measurements are not suitable for direct sociological treatment without considerable feats of imagination.

Time budget data offer another, and probably more fruitful, approach to quantifying work activity. Yet a systematic survey of time allocated to highly

diverse food production tasks among a scattered population utilizing statistically meaningful samples, of say 25 to 30 homesteads, would be a major undertaking, occupying a team of investigators for a considerable period. The use of time budget data in the study reported here falls short of the ideal, but generates figures which illustrate the substantial amount of work devoted to stock production activities among the Gabra.

Of the 355 homesteads covered by the study, 60% maintained small stock, camels and cattle. Stock owners sent out most of their cattle, sheep and goats to satellite camps (*fora*) during most of the 15-month drought which occurred while field data were being collected. Not all households had sufficient labour reserves to send their dry camels to the *fora* as well, and most of those who did waited until the drought became severe. Camel cows with their young calves stayed at the main camps.

The range of tasks and time requirements for the management of each type of stock were ascertained by interviews and observation. From these data it was possible to calculate the modal number of hours devoted to stock management and the minimum number of people required. These figures became part of the work budget of a hypothetical homestead. The numbers of hours and people involved in livestock watering chores were also calculated. Naturally, these data varied, *inter alia*, with the distances the herds travelled to reach water points. The time required for the entire watering operation, from the departure to the return from the wells, was ascertained through interviews with informants at the camps and through observation of arrival and departure times at the wells and the routes followed. Again the modal number of hours and the minimum number of people required were calculated.

Herding and milking

One person is sufficient at any one time to manage the adult animals at the main camp when most of the small stock are at the *fora*. Kids, lambs and their dams wander unattended near the camp. Flocks tend to scatter when they are out at

pasture if left unattended, so they must be watched at all times, normally by children, adolescent girls or elderly men.

Herding and milking require about 12 hours of labour a day, 25 days of the month. The flock goes to water 5 days a month, travelling about 30 km and also browsing about 2 hours. Thus total grazing and browsing time averages about 310 hours a month when one person is required to look after the flock, though this is not necessarily the same person throughout the period.

Tending camels in light to medium bushland is not particularly arduous during the dry season. Scattered animals must be checked and brought back together every hour or two. Camels tend to drift toward wells, especially as the watering day approaches. At this time, the herders, who are older adolescents and young men, must keep close watch on the animals. Milking and herding require the labour of one person 12 hours a day. A modal camp would be about 30 km from the source of water for camels. They are watered every 12 days, requiring 2 days for the journey to and from the wells. During the other 25 days of the month, about 300 hours of labour are required for camel herding and milking.

The pattern of labour at the *fora* is similar to the pattern described for the main camps, although the organization of the work and the individuals involved vary considerably. Women and girls are not permitted to stay in camel *fora*, they seldom join cattle *fora* but they comprise about one-third of the labour force in small stock *fora*. Men from adolescence to their mid-30s comprise most of the labour force in the cattle and camel *fora*, while the small stock *fora* include a fairly mixed age group, though excluding married women. A survey of 10 small stock, 4 camel and 2 cattle *fora*, combined with numerous interviews, yielded an average of 1.5 workers per herd or flock for herding, milking and watering. This means that one primary herder receives assistance from others for a variety of chores. If a production unit maintains three *fora* for different types of stock, with 1.5 workers spending 12 hours a day on stock management, this requires 1620 hours of labour a month.

Watering

Watering activities are only described separately for the main camps: time spent on watering is included in the general herd management calculations for the *fora*.

Of the 90 camps included in the study, 60% were at least 30 km from camel watering points. At this distance, watering requires a roundtrip journey of 1.5 to 2 days. Typically the animals to be watered leave the camp between 09.00 and 10.00 h and reach the wells around sunset, allowing the herds to browse en route. The camels are then watered at night or the next morning.

Camel watering requires a good deal of labour, for several reasons. First, camel herds are generally banned from all but the larger wells, so that the wells used by camels are often crowded. They must also water after the cattle and small stock when all three types of livestock use the same well. Camels arriving in the morning may thus wait several hours for their turn. While waiting, they must be forcefully restrained from stampeding to the troughs. Also, lactating cows must be prevented from returning to the camp before the other animals finish watering. Finally, camels drink and rest in turn. Often one herd makes three to four visits to the trough before returning to the camp.

Deep wells require two to eight persons working in a human chain to bring water to the surface by hand. Labour is also required to repair the mud troughs. Commonly, a number of herders leave a camp together for the same well complex, although they do not necessarily use the same wells. At the wells, they assist each other in herding chores when this is possible. Young and middle-aged men, and occasionally unmarried women, participate in watering. All together, 5 to 8 hours are spent at the wells. If 1.5 people spend 18 hours for the journey and 7 hours at the wells 2.5 times a month, the total labour allocation for watering a camel herd is 94 hours a month.

Women, ranging in age from adolescence to late middle age, also go with pack camels to fetch water for household use. One to two people in each household perform this task every 3 to 5 days. An 3-hour journey covering 32 km and requiring 1.5 people every 4 days entails 90 hours of labour a month.

Flocks of sheep and goats kept at the main camps drink from the same sources which provide water for the homestead. They are taken to water 5 times a month by women from adolescence to late middle age, requiring 2 people working 8 hours each day, or 80 hours a month.

Labour requirements related to supply

All these estimates of labour allocations have been calculated conservatively. Where bush cover is dense, two or three people are often required to herd camels or small stock, and in general more people might work together on other tasks than the numbers assumed here. Moreover, camel milking, which has been included with herding here, requires two to three people up to 2 hours a day, though the overall estimate of labour requirements here was based on the activities of only one person.

More work is required during the dry season and sufficient labour must be available for this period, so labour allocations during the wet season were not calculated. At any rate, dry-season routines occupy at least half the year and may last even longer. Treating sick or injured animals, repairing the pens and the daily herd inspection are all carried out by the household heads: none of these activities has been included in the labour calculations.

Understandably, the Gabra are at a loss to specify daily labour rosters beyond a week or two, and cross-checking of individual labour inputs reveals problems of reliability. Total labour requirements may be calculated, however, as shown in Table 1.

Table 1

MONTHLY LABOUR REQUIREMENTS AMONG THE GABRA

	Hours
Small stock at main camp	
herding and milking	310
watering	<u>80</u>
total	390
Camels at main camp	
herding and milking	300
watering	<u>94</u>
total	394
All <i>fora</i> stock: herding, milking and watering	1 620
Household water supply	90
Total	2 494

If a total of 2494 hours are required a month to look after a homestead's livestock and fetch water, this implies that seven people would be working nearly 12 hours a day, 30 days a month. However, a survey of 25 camps revealed 139 out of 243 homesteads (57%) with only one household, averaging 3.7 members. An additional 70 homesteads (29%) had two households, or an average of 7.4 individuals. A comparison of estimated labour requirements with labour supply suggests a situation of labour scarcity, at least during the long dry season when herds and flocks are kept at *fora* camps. Household production units among the Gabra are thus dependent on labour sharing, and a number of social institutions have been developed among the Gabra for this purpose, many of which are not found among less labour-intensive pastoral populations.

Institutions for labour sharing

Quasi-adoption is a common practice in families with large herds and a relatively small domestic work force, particularly among household heads who have few siblings. Children are 'borrowed', preferably from close affines. Typically, they range in age from 6 to 10 and remain for several years with the family engaging their services. The parents gain by having their child well provided for, and they obtain periodic gifts of stock from the grateful custodians. Homesteads with large herds and inadequate labour supplies also tend to transfer their animals to others. Thus the system of stock exchanges and quasi-adoption tends to bring the livestock holdings and labour supplies of individual homesteads into balance, so the Gabra have less need to sell stock or look for employment outside the pastoral sector.

Homesteads living next to each other and linked by close affinal ties may also unite to form a homestead cluster, for part of a season only or for up to several years. Homesteads associated in this way pen their camels together, send their stock to the wells and pastures together, share meat and exchange milk animals. In the pastures, the camel herds are divided but browse near each other.

By joining together, a cluster of homesteads enjoys economies of scale, for instance by building and maintaining one, rather than several, camel pens. When herds are grazed near each other, the herdsmen may call on others in an emergency and fewer herdsmen may be required overall. Labour can also be saved when animals from a cluster of homesteads are watered together.

Gabra men tend to delay marriage until their early- to mid-30s, which ensures a larger labour supply in their fathers' households for a longer period. After marriage, the groom customarily lives for 1 year with the bride's family, and during this period his family performs other services for the family of the bride. If the groom's father is alive, he also moves into the camp of the bride, along with his other sons. These affinally linked homesteads tend to form a homestead cluster, with labour pooled as described.

Sons remain with their father until he dies. At that time, the family herds are shared out among the sons, with the eldest inheriting the largest share. Married brothers may then disperse, but unmarried brothers and sisters remain in the household of their eldest uterine brother. This pattern tends to postpone the eventual division of family livestock holdings and labour supplies.

Many Gabra clans also maintain ties with neighbouring groups of Borana. Gabra who own cattle benefit from these associations by entrusting their animals to Borana herdsmen, who graze their herds on the well watered Megado escarpment and around Mount Marsebit. The Borana keep the milk from Gabra animals and the meat of animals which die. The Gabra owners, in turn, are able to perpetuate their cattle holdings with little or no investment or labour.

Families of Watta, Konso or impoverished Borana are frequently found living in Gabra camps. The Watta and Konso tend to work for several homesteads, while the Borana are associated with specific Gabra families. They perform special services, such as smithing and hunting, and help tend the herds. In return, they receive gifts of small stock and occasionally pack camels.

Marriage patterns also tend to divert livestock and labour resources to the Gabra from other tribes because Gabra women frequently marry men from other tribes, while Gabra men seldom do. The bridegrooms and their relatives come to work for the households of the brides, and the brides' families receive stock from the grooms' families throughout the period of the marriage. The brides and their children eventually leave their fathers' homesteads to live with their husbands' tribes, thereby expanding the network of affinal relationships on which the Gabra can call for assistance. Also, this exodus is balanced to a considerable extent by a tendency for men who marry Gabra women to assimilate with the Gabra.

Borana social organization has also been described by Haberland (1963: 167-273), Asmarom (1973) and Baxter (1954). Every man is admitted to a *luba* based on the *luba* of his father, while women assume the *luba* of their husbands. All Borana patrilineal descent lines are affiliated with one of five geneological chains, or *gogessa*. A new *luba* is opened in one of the *gogessa* every 8 years. Thus sons are admitted when a new *luba* is opened in their fathers' *gogessa*, or 40 years

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10. WATER RESOURCES IN NORTHERN SOMALIA

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INTRODUCTION

This paper is based on research carried out in 1971 and 1973. It contains an analysis of material collected during fieldwork and information gathered from literary sources.

The literature available on the nomads of northern Somalia can only be characterized as scanty, particularly the literature on earlier periods. Almost all sources from the pre-colonial and early colonial eras could be classified as travellers' reports: they contain little information on local production systems.

Almost no data are available on water resources and their role in Somali pastoral society in the past or present. Here the importance of traditional water categories as significant bases of reciprocal relationships is discussed and emerging forms of social differentiation are analyzed briefly, along with their implications for social structure and the exploitation of the natural environment. New forms of social differentiation arise out of the pastoral economy's contact with modern modes of production. These developments could lead to capitalistic economic patterns if counter-measures are not taken by the Somali Government.

First the water resources themselves are described, and then the procedures for watering livestock and collecting water for human consumption. Distinctions among different categories of water quality are briefly discussed, and finally some of the implications for the pastoralists of water development activities are noted.

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TRADITIONAL WATER SOURCES

Haroyin surface pools

Haroyin (sing. *haro*) are large pools, covering several hundred to a few thousand m², usually round or oval and only 2 to 3 m deep. In northern Somalia, they occur only in the inner Haud area. At some places, several *haroyin* are located close together in a cluster, which is given a name, for example *harodijed*. In most cases, however, *haroyin* are quite far apart.

These basins collect only rain water, and do not contain subsoil water. The *haroyin* hold water during the *G'u*, the major rainy season from March to April, and for some weeks into the dry season, depending on their size, the amount of rainfall and prevailing temperatures. It is believed that they were built by the people of earlier times, but it was not possible in this study to investigate whether they are in fact artificial or of natural origin. Nor was it possible to obtain unequivocal information on the rights associated with their use.

Since water does not need to be elevated, watering animals at the *haroyin* is easy. Animals can drink standing at the edge of the watering place, or the water can be drawn into a container.

The *haroyin* are located at some distance from the area of investigation, but groups which were studied sometimes reached them with their camels. With goats and sheep, it was only possible to reach two *haroyin* located in the northernmost part of the inner Haud.

Baliyo pools

The study area has many *baliyo* (sing. *bali*), which are also old watering places. These are flat artificial pools, 8 to 10 m in diameter and 1 m deep or slightly more. Part of the excavated soil is heaped into a wide embankment about 0.5 m high, which flattens out in the course of time. The embankment

is broken on one side so that rain water can run into the pool. Sometimes people dig small trenches reaching out from the *bali* which collect rain water and drain into the *bali*.

The *baliyo* are built by extended families to commemorate a deceased father or grandfather. This endeavour is considered a good deed which eases the family member's entrance into paradise. After building a *bali*, the family is responsible for the regular cleaning required for its maintenance.

The location of a *bali* must be selected carefully. It is built in the rainy season, in former times using a *gudin*, or digging stick, but more recently using manufactured spades and hoes. The *baliyo* hold water in the *G'u* rainy season and often also in the *Dayer*, the secondary rainy season from late July to early November, but not in the dry seasons. A *bali* may be used by anyone without restrictions. Many *baliyo* have recently been neglected, however, as they have been replaced by new larger *baliyo* and the *berkado*, another type of reservoir which will be discussed.

Waro pools

Another type of traditional watering place is the *war* (plur. *waro*). A *war* resembles a *bali*, but is smaller. *waro* are often dug in natural depressions or in places where camels used to roll in the loose soil. A *war* is about 60 cm deep and scarcely more than 50 m². *waro* are built by extended families, or sometimes by nuclear families. As with the *bali*, the construction of a *war* is considered a good deed intended to help the soul of the father to enter paradise. The *waro* retain water only in the *G'u* rainy season, or occasionally also in the *Dayer* season. In most cases animals can only be watered from a *war* for a few weeks before it dries out.

A *warmagod* (*war* of the women) is a type of small *war* which is dug by women, usually near a homestead, to be used for a short time. In recent times, however, both type of *waro* have become rather rare.

Ceelalgaban shallow wells

A *ceelgaban* (plur. *ceelalgaban*), meaning a shallow well, also called *las*, is usually a round well, 1 or 2 m in diameter and at most some 8 m deep. These wells are dug on the edge or in the centre of a *wadi*, or seasonal river bed, in sandy soils. The excavated soil is thrown up as an embankment around the well. If the well is to be used to water sheep and goats, it may be dug by one extended family; if it is to be used for watering camels, it may be dug by the young men from several extended families responsible for tending the camels. This work may not take more than a few hours if several men work together, as the light sandy soil can be excavated without great difficulty. *Gudin* with straight handles are used for this work, and the soil is carried out in any type of container. The walls of *ceelalgaban* are not enforced.

A *ceelgaban* can provide water well into the dry season if it is sufficiently deep. These wells are the traditional watering places for camels, which walk to them over a period of several days from the Haud area during the dry season. *Ceelalgaban* are also important watering places for goats and sheep in the dry season, but they can only be used for short periods. Then after a few days or a week or two they collapse, with the sandy walls sliding down. Sometimes a new *ceelgaban* is then dug nearby. Once the people who dug a *ceelgaban* leave the site, anyone may use it.

Temporary water sources

After a rain, animals may be watered at small temporary puddles, or water may be collected from puddles for human use. Natural holes (*moqoor*) also develop in some kinds of trees where small amounts of clean water may be collected. The pastoralists carry a tube with them, made of the bark of a plant called *xangeeyo*, which is used for sucking out the water which has collected in trees.

In an emergency, pastoralists have been known to slaughter a camel and drink the liquid from its stomach - a practice called *uusmir*. The stomach is

hung from a tree and a small hole is cut, through which a liquid drips out. This is collected in the container normally used for milking. Enough liquid can be collected from one camel's stomach to satisfy the thirst of six people, but it is extremely bitter. This practice is very rare: in the study area, no case could be remembered from the past 25 years.

RECENTLY DEVELOPED WATER SOURCES

Baliyo reservoirs

New types of water sources include *baliyo* which are larger and deeper than the traditional ones. They may be 1000 m wide or more and 2 to 3 m deep. A new *bali* is constructed in a slightly sloping site, with the excavated soil used as an embankment. The upper side is not banked, and ditches draining into the *bali* are dug out radially for several hundred metres. The larger *baliyo* are constructed by larger groups, often to commemorate a common ancestor whose soul is to be helped into paradise.

Such large reservoirs can only be built with modern hand tools, such as shovels and spades. They are built only in the rainy season and take weeks to complete. Usually, a large kinship group builds only one *bali*, with extended families or groups of families responsible for particular parts. Some individuals may work at the site for a few days and then return to their herds, while others from their group continue the construction work. Leadership is informal, with the necessary coordination provided by the oldest and most respected men in the group. A group in the study area built a large *bali* at the beginning of the 1960s which is still in use. In contrast to most others, this *bali* is rectangular, measuring 27 x 32 m.

During the past 15 years, many new *baliyo* have been built, partially replacing the traditional watering places. During the last years of the colonial administration, the British built six large *baliyo* with modern machinery on the road from Hargeisa to the east. Since independence, several *baliyo* have been

built at government initiative, using modern equipment. Most of the new *baliyo* have water during both rainy seasons. They are used freely by anyone without remuneration.

Private wells near *baliyo*

Recently, small private wells have been dug near some of the new large *baliyo*, usually about 1 m in diameter and 3 to 5 m deep and about 5 m from the *bali*. They are dug with crowbars or with the traditional *gudin* blade, fitted into a straight stick rather than the usual v-shaped handle. Exceptionally clean water comes into these wells from the bottom and sides, partially from the subsoil and partially from the neighbouring *bali*.

The elders of the kinship group which constructed the *bali* make sure that only a limited number of wells are dug nearby. The first well can be dug in the most favourable site, and others must be spaced out at some distance. These wells are dug by extended family groups or nuclear families, and are considered private property. Some of them are covered with lids which are fastened to the concrete around the tap of the well with padlocks. The water is brought up in buckets.

These wells usually have the capacity to water 50 goats or sheep every second day throughout the dry season. The family which owns a well uses it for its daily water requirements: no cases of selling water were observed.

Xurfado pits

In the last years of colonial administration, large open quarries or pits were dug with modern equipment to provide material for roads and other construction sites. These pits are called *xurfado* (sing. *xurfad*), and some of them collect a considerable amount of water during the rainy season. Depending on their size and depth, they retain water for some time into the dry season. They are used freely by everyone. However, the water in many of them appears to have a high

mineral content, which the livestock, particularly the camels, do not like.

Berkado reservoirs

Berkado (sing. *berkad*) are reservoirs lined with stones and concrete. Many of these have been built in the past 10 years at sites where large quantities of water flow together during the rainy season. Generally, only families with some members working in town or abroad can afford to have a *berkad* built: only rarely does a herd-owner earn enough money to build a *berkad* by selling animals.

The owner generally hires daily labourers from town or from among his relatives who dig a pit with hoes, shovels and spades. Then a mason is hired to complete the stonework. Suitable stones must be available near the site to avoid large transport costs. A half-finished *berkad* was observed in the research area which was 18 m² with a depth of about 2.5 m.

Berkado are private property, and some are surrounded by a fence with a gate locked with a padlock. To protect the water from evaporation, some are also covered with tree branches. They are used principally to water livestock during the dry season. The owner waters his own animals and may sell water to others during times of shortage. In such cases, water is measured in a barrel or in gallon containers. One barrel may cost from Shs. 5 to 25, depending on supply and demand factors.

Access to *berkad* water is also based on family relationships; the owner's brothers do not have to pay for water but cousins usually do unless they live in the owner's household. Relatives are only required to pay in the following year, however. Also in cases of emergency, public opinion would condemn a *berkad* owner if he refused to give water to his relatives. In such a case, the community refers to the children of the relatives who would suffer from lack of water. It is clear that the private ownership of such an important watering place is still a novelty in the social relations of these pastoralists.

It is too early to judge whether *berkad* ownership represents the beginning of social differences. A *berkad* owner's management patterns are affected because he tends to keep his animals near the *berkad* during the dry season. Though in principle he can sell water to others, in fact only a limited amount is collected in a *berkad*, and there is little available to give away or to sell beyond the needs of the owner's own herds.

One case from the study area illustrates how ownership of a *berkad* may boost an individual's economic position, though it remains to be seen whether such a pattern will become more widespread. In 1971, a man who worked in Hargeisa town had two *berkado* constructed in the area where his relatives usually kept their herds. This man had two wives: the older one lived in town and the younger one and her children lived with his relatives who moved with the herds. The man himself spent some time in each household. He bought sheep and goats at low prices during the dry season and sold them in the rainy season, when prices were considerably higher, to traders in town. When the pastures around his *berkado* were used up, his relatives moved the animals away. As he owned an old Land-rover, his eldest son, who had learned to drive in town, took water to the animals in barrels so they did not have to walk for several hours to the *berkado* for water. In this way, he appeared to earn substantial profits.

Deep wells

All the water sources which have been discussed rely entirely, or almost entirely, on surface water: subsoil water is not tapped. In very dry seasons, especially if 2 dry years occur in a row, even the wells at the edge of the *baliyo* have very little water, and the water in the *berkado* is insufficient. Pastoralists in the study area and in other parts of the country are becoming increasingly aware of the advantages to be obtained from digging deeper wells.

In 1971, for example some herd-owners in the study area began making plans to build a deep well. They planned to sell sheep and goats to help cover the

costs and to ask for government assistance. By 1973, however, the project was still not underway. One man who lived in Hargeisa reported:

We have discussed the well on many occasions, but unfortunately have not reached a consensus. I suggested that we build a deep well with stonework walls on a self-help basis. It should be more than 10 men deep. It should have permanent water. We should bear the costs ourselves and do the work ourselves, under my supervision [as he had experience constructing *berkado*]. Other men felt we should ask the government for help and have the well drilled by modern technical means. We discussed it again and again. All understood the necessity of building the well. But we could not reach any agreement on how to construct it [i.e. with government help or independently]. Those who wanted to build the well alone were a minority. Until today, the question is unresolved. But we still hope we will build a well in some way.

From the beginning, these pastoralists intended to build a deep well for free public use. It is clear from this report that they understood the value of building a deep well and maintained their interest for several years. The idea of asking the government for assistance emerged because the government had already drilled a number of wells not far away.

LIVESTOCK WATERING

Traditional methods of watering livestock are rather simple. Animals are driven to the edge of surface pools or reservoirs to drink, or water is brought up to the surface from wells in skin bags pulled by ropes.

From a *ceelgaban*, a shallow well dug in a dry river bed, water is brought up in conical buckets which contain 4 to 5 litres and are carved from the wood of a specific type of acacia tree. Three or four men pass the buckets up to a trough from which the animals drink. This trough was originally made of skin stretched from poles, but now canvas is used or a large zinc tub. The buckets are thrown up with considerable speed, which requires a good deal of skill. These wells are dug and the troughs built by an advance group of herdsmen, so that when the animals arrive they can start being watered immediately. When camels have been without water

for some time, they push urgently towards the watering place so they must be carefully controlled and led up to the trough in small groups.

From the wells near the *baliyo*, water is brought up in buckets made of old tyre tubes pulled by ropes. Watering troughs, usually made from metal drums, are used near these wells and near the *baliyo* and *berkado*. To avoid pollution, animals are no longer driven to the edge of surface water. Watering troughs and buckets are frequently left by nomadic herdsmen with relatives or friends staying in settlements near the water sources.

Camels are watered from troughs in groups of five or six. Each group is usually watered twice so they can take enough to last until the next watering. The herdsmen often sing special songs which are meant to induce the camels to take more water, and, in fact, camels which have already been watered can be seen returning to the troughs when the herdsmen sing. There are watering songs which are sung when camels first drink and others which are sung when the herdsmen want the animals to return to drink again. For example, for the first watering the following song was recorded:

Sidii sagaal roob
Like nine rains

Do si san u da'ay
Which poured down in abundance

Waa sugeymaye;
We did wait;

Maysa soo ahubay.
It has over-flown.

For the second watering, the herdsmen might sing:

Sool baad tegiye
You will go to Sool

Soddon baad qadiye
Thirty [days] you will be without it,

Sulubey, blhaya,
Sulubey [name of camel], water.

Siddam doonaytyo,
As I beg you,

Sitb - sitb u qayo,
Mouthful by mouthful, take it;

Suluquna kareeb
Leave all resentment.

I M Lewis (1961: 86 - 86) has also recorded some watering songs.

WATER FOR HUMAN CONSUMPTION

Water for human and livestock consumption is taken from the same sources. When the animals are driven to watering places, water for the people is taken at the same time, but additional trips may be required in between to bring water back for human consumption. Water is carried on pack camels, and in the past it was often carried over long distances, especially after the *G'u* rainy season. A family grazing their herds on the Qotten plains, for example, had to bring water from the Hargeisa area, requiring a return journey of 48 hours. A family staying in the Tuur area had to travel for 72 hours to fetch water. Families seldom have to travel such long distances to collect water any more, but water supply for human consumption remains a problem in many areas.

Camels normally carry four smaller water containers or two larger ones, which hold up to 55 litres each, but particularly strong animals may carry four of the larger containers over short distances. The animals' loading capacity depends to some extent on their level of nutrition at different seasons, but in general they appear to be underutilized for journeys over short distances: they carry much heavier loads over long distances when households are migrating.

The traditional container for carrying water is a *haan*. These large water-tight containers are woven by women with considerable skill from plant fibres.

Each has a capacity of about 35 to 70 litres. They cannot be put upright on the ground because of their conical shape, but are placed in holes, supported by baskets of thin sticks. A very large *haan* is called a *gaboo*.

Another traditional water container, the *haangorii*, is made by men of acacia wood. These containers are also used to store grain. Since World War II, 18-litre petrol or kerosine drums have been used to carry water, and more recently local blacksmiths have begun making water containers from sheet metal in the traditional conical form. Some nomads store water in large metal drums, but usually water is stored in the same containers in which it is transported.

Water containers are kept in the homestead along the inner walls of the *aqal*, the Somali hut. Traditionally, water was taken from these containers with a wooden dipper, but now small manufactured jars or other utensils are used.

WATER QUALITY

The pastoralists distinguish three categories of water according to its purity. *Xareed* is clean water which tastes good. Water of this quality is found in wells and *berkado* and in *baliyo* at some times of year. *Dhogo* is water which has been standing for some time in *baliyo* or *xurfado* and is mixed with soil. It is normally only used for watering animals. When the water level is low, the pastoralists try to skim off the clear water at the top. *Ajoo* water is polluted, especially with the urine of animals standing at the edge of the watering place. This water is found in *baliyo* and *xurfado* which have been heavily used over long periods without rain. It is rarely consumed by humans, and even animals drink it with reluctance.

Greater stress is put on keeping water clean than in earlier times. Thus, increasingly, the pastoralists carry water to troughs for their animals and individuals who bring their herds to the edge of the water source are criticized by others.

Though people and animals use the same water sources, illness due to polluted water is rare.

IMPLICATIONS OF WATER DEVELOPMENT

Recent improvements in water supply, with the construction of *berkado*, *baliyo* and wells, have reduced the mobility of many nomads in the study area. Most families stay longer in one place than in earlier times and travel shorter distances. The number of animals has also increased, particularly of sheep and goats, and herds are seldom divided into smaller units to take better advantage of limited water and grazing supplies. The concentration of animals around the new water sources has led to considerable overgrazing.

To protect the pastures around water sources, grazing will have to be limited in certain areas at certain times of year. This control of land use will not be achieved by government regulation alone, but will require the active participation of the pastoralists themselves. Environmental protection is not a new concept for these herdsmen, however, as shown by the increasing protection of water sources against pollution, and recent attempts to prevent deforestation by limiting tree cutting. Thus, a basis exists for the introduction of grazing controls.

TOWARDS AN INTEGRATED APPROACH

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11 AN ECOSYSTEMS APPROACH TO EAST AFRICAN LIVESTOCK PRODUCTION SYSTEMS

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INTRODUCTION

The mandate of the International Livestock Centre for Africa (ILCA), as formulated at the Centre's establishment, is:

to assist national efforts which aim to effect a change in production and marketing systems in tropical Africa so as to increase the sustained yield and output of livestock products and improve the quality of life of the people of this region.

Devising means of increasing livestock production in eastern Africa and monitoring the effects of changes in the livestock production systems of the region are extremely difficult, because of the complexity of these systems and because they are generally geared to provide subsistence for the herd-owners rather than commercial offtake which would be easier to measure. Unless, the productivity of existing systems is known, it is not possible to judge whether changes in modes of production are, in fact, improvements. It is also not possible to assess whether the quality of human life is being improved without understanding how people are living and what qualities of life they value. Yet the functioning of most indigenous livestock production systems in eastern Africa is not, in fact, well understood.

Why should this lack of understanding persist after decades of anthropological and ecological research in the region, and how can a better understanding be achieved which will make it possible to devise development plans that will truly benefit the people? These questions will be addressed in this chapter.

*Since this chapter was written in 1977, a pilot study has been initiated for a multidisciplinary research project on the south Turkana ecosystem, funded by the US National Science Foundation.

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GOALS IN INDIGENOUS FOOD PRODUCTION SYSTEMS

One major reason for the present inadequate understanding of livestock production systems in eastern Africa is that many anthropologists and others have failed fully to appreciate the ultimate goal of the people involved in these systems. At the risk of oversimplifying, the goal for the majority is the survival of the pastoralist and his family, although it may be stated in terms of proximate goals such as large cattle herds, prestige or many wives and many children. Although it can be demonstrated in particular cases, it is impossible to prove that in general people's behaviours represent successful strategies for survival. However, this is a reasonable working hypothesis in a subsistence system where the amount of food available means there is only a small margin between survival and starvation, and yet the people have, in fact, survived.¹

If the behaviour of people living in marginal environments can best be viewed as reasonably successful strategies for individual survival within the total environment, then the proximate goals of the local populations must be carefully considered and evaluated in terms of the ultimate goal of survival. Obviously, strategies for increasing the likelihood of survival vary according to the ecological constraints on a particular system. Where arable land is limited, people should try to maximize production per unit of area. Where land is not limiting, people may try to maximize yields per unit of labour, since, other things being equal, labour not used in food production can be used in other ways to enhance the likelihood of survival.

An important goal in virtually all subsistence systems, in addition to maximizing production, must also be to minimize risk. Since maximizing an output of a system is likely to lead to increased variance in productivity (K Levins, personal communication), any subsistence production system represents a compromise between the incompatible goals of maximizing some form of productivity and minimizing risk. A successful subsistence strategy produces food energy as efficiently and as reliably as is possible within the constraints set by the physical and social environment.

¹This 'neofunctional' approach is not necessarily shared by people in other branches of anthropology or in other social sciences. Sometimes, in fact, development planners seem to start with exactly the opposite assumption - that what the local people are doing *must* be irrational and maladaptive, because they do not behave the way the planners do.

In contrast to subsistence systems, the aim of development programmes generally is to maximize the productivity of that part of the local food production system which can readily be transferred to other local systems, and to develop or encourage transfer mechanisms which integrate local food production systems into national or international markets. Success in development schemes is measured by economic indicators, which are often totally unrelated to the production of food energy within a specific system. Much apparently irrational resistance on the part of subsistence farmers or pastoralists to changes proposed by development planners can almost certainly best be understood in terms of these differences in goals. By taking the goals of the subsistence producers into consideration, planners could devise development programmes which might be accepted more readily.

THE COMPLEXITY OF LIVESTOCK PRODUCTION SYSTEMS

Livestock production systems in eastern Africa are extremely complex. For example, they often include many different species of livestock - cattle, goats, sheep, camels, donkeys. Although these are often lumped together as livestock equivalents in discussions of range use and carrying capacity, in fact the needs of all these animals differ. Goats browse, while sheep graze. Camels are far more water-independent than cattle. Donkeys may be able to survive well on the dry grasses which have insufficient protein for ruminants. The similarities and differences in the requirements of domesticated herbivores must be understood in order to understand livestock production systems.

The variety of food eaten by livestock producers also contributes to the complexity of production systems. Livestock are consumed as meat, and their milk and blood are also consumed. Pastoralists, particularly in arid environments, often use other food resources as well, such as game, the leaves, fruit and roots of wild plants, and grain, which may be purchased by trading livestock or raised in limited areas where conditions are suitable. This use of different foods from different sources makes it difficult to measure the amount of human food produced by the system.

The unpredictability of the environment further contributes to the complexity of livestock production systems. Because people respond opportunistically to

rainfall and pasture resources, which vary in time and space, grazing movements and other herd management practices may vary enormously between individual production units (Dyson-Hudson and Dyson-Hudson, 1969: 1970). All these factors, taken together, make eastern African livestock production systems complex and difficult to analyse.

INDIGENOUS VERSUS WESTERN RANCHING SYSTEMS

Although eastern African livestock production systems are not fully understood, some of the ways in which they differ from Western ranching systems can be described and the possible implications for development planners noted. For one thing, herdsman do not seek to minimize labour inputs, but rather guard their herds intensively to maintain continuous control over the animals' grazing and to minimize losses to carnivores and thieves. Thus large numbers of people both look after and depend on relatively small numbers of livestock - and the potential for offtake is relatively low. A ranching system with few people maintaining large numbers of livestock has a greater potential for offtake. But if the pastoralists' intensive methods of husbandry maximize reproductive rates, for example by carefully guiding the livestock to the best grazing, and minimize losses by careful guarding, then simply substituting ranching for subsistence herding could very well lead to a decrease in livestock production.

Livestock in eastern Africa convert the food energy in grasses which people cannot use directly into meat, milk and blood which people can use. The conversion of vegetation to blood and milk is more efficient than the conversion of vegetation to meat, i. e. more kilocalories of human food are produced per given kilocalorie input of vegetation. This means that, unless other changes are introduced, the productivity of these complex subsistence systems is almost certainly higher than the productivity of a system producing only meat, using the total number of kilocalories of human food as the measure of productivity. Simply stated, the more efficient conversion of vegetation to human food means that, other things being equal, more people can be fed by a system producing blood, milk and meat than by a system producing only meat. If local populations have ample food, reduced productivity is not a major consideration. But if food energy is in short supply, then any reduction in the productivity of the local system must be compensated by inputs of food energy from other systems. In other words, food

will have to be imported to compensate both for the food exported and for the reduced productivity of the local system. Exchanging some of the high-protein foods from livestock systems for some of the high-calorie foods from agricultural systems based on grain production can benefit both groups. But development planners must be aware that exchange will be necessary, that food must be imported into the livestock producing regions as well as exported from them.

In East African subsistence systems, livestock have functions other than providing food. They are important, for example, for bridewealth, for prestige, for sacrifice and religious observances. Livestock are given to relatives of the bride at marriage in exchange for the reproductive capacity of the woman which is obtained by the groom. The exchange of bridewealth also gives the groom new relatives to whom he can turn in times of stress - thus helping to reduce his risk in an unpredictable environment. Large herds of livestock give a man prestige, but they also enable him to marry many wives and gain many supporters, both of which assist his survival and the survival of his family. Sacrifice and prayers are important rituals in themselves, but they also provide food for the participants in the ceremonies, which occur particularly frequently during times of hardship. It can therefore be argued that the uses of livestock for purposes other than food contribute to the ultimate aim of increasing likelihood of survival. In particular, livestock redistribution through such practices as bridewealth and ceremonial slaughter is an important means of reducing risk. Since the eastern African savanna is an unpredictable environment, development schemes must provide alternative ways of reducing risk if livestock producers are to be integrated into the national economy and traditional practices changed.

This brief discussion of some of the differences between traditional livestock production systems in eastern Africa and Western ranching systems gives some indication of the constraints which may be operating on development planners, and why it is important to understand indigenous systems before seeking to modify them. Innumerable questions must be answered. What are the requirements of the various kinds of livestock? Have these subsistence systems, in fact, devised strategies which increase the likelihood of survival? Do herdsmen deliberately attempt to guide their livestock to areas of optimal grazing - hour by hour as well as day by day and week by week? Is vegetation limiting the productivity of herds,

and if so which is limiting - calories or nitrogen? Are calories also in short supply for the human groups which practise subsistence herding?

INTEGRATING RESEARCH ON LIVESTOCK PRODUCTION SYSTEMS

If the behaviours of livestock owners in eastern Africa are in general adaptive strategies for survival in the environment in which they live, then an understanding of their livestock production systems must be based on an appreciation of the total environment within which they operate. This perspective includes abiotic factors in the environment, such as soils, rainfall and water supplies as well as biotic factors, such as vegetation, parasites, predators and competitors. It includes all the ways in which people use livestock - for establishing social relationships and for enhancing prestige, as well as food. Consideration must also be given to potential resources which people do not use at present because of particular values and beliefs. Because of the complexity of livestock production systems, researchers generally consider only particular elements of a system. Soil scientists analyse the chemical composition of the soils, botanists classify and map vegetation, animal scientists study the livestock and anthropologists study the people, focusing, for instance, on their values and beliefs. But too often this mode of analysis does not lead to an understanding of the interactions between the elements of the system - how soils relate to vegetation and how vegetation relates to livestock reproduction rates which in turn influence and are influenced by the values and belief systems of the people. In seeking to understand complex livestock production systems, the focus must be on critical parameters and interactions, not simply on isolated elements of the system. Nevertheless, the skills of specialists are needed: botanists, soil scientists, animal scientists, anthropologists and others.

How can the system be broken down, for purposes of analysis, without losing sight of the inter-relationships of the system as a whole? One way this may be achieved is by developing a model of the system, which should not be all-inclusive (i. e., it does not include all the interesting or important relationships in the system) but should be all-encompassing (i. e., it must include abiotic components, productive organisms, consumers and the important interactions between them all). If such a model includes critical parameters and inter-relationships, it can act as a guide for research.

The process of modeling involves four stages, which proceed in a cycle. Since a model is valuable only in as much as it reflects the real world, it must initially be based on some knowledge of the component parts of the real system. So the first step in developing a model is to gather data about the real-world phenomena one is trying to understand. The next stage is to formulate certain assumptions about these phenomena in as precise language as possible. Ideally, the relationships should be expressed in precise mathematical formulae. However, for early stages of research, this is generally not possible, so a useful model can simply indicate whether the relationships between the elements of the system are positive, negative or both. The third stage is to use the model to make predictions about the real world which can be tested. Testing the model consists of drawing conclusions about the real world which can be of two types: those related to previously observed situations, which are explanatory, and those relating to new situations, which are predictive. These conclusions and predictions must then be tested against empirical data. Finally the real-world data gathered to test the model can be used to improve its explanatory and predictive powers. By repeating these procedures, it is possible over time to develop a model which explains the real-world phenomena increasingly fully and accurately (Roberts, 1976).

By using models in conjunction with empirical studies, the understanding of the whole system and of its parts proceeds hand-in-hand. The model can help in breaking down the analysis of the whole system into smaller, manageable units, each of which can be handled by specialists. Yet by relating specific research to the system as a whole through the development of the model, the work of each specialist will not simply be adding to information in one area, such as soils, vegetation, livestock or people, but rather individual research will contribute to the understanding of the whole complex system by focusing on those critical relationships and parameters elucidated by the model.

APPLICATION OF A MODEL TO A SPECIFIC LIVESTOCK SYSTEM

The preliminary stages of model development will be discussed for an eastern African pastoral system, using the Turkana of Kenya as the specific example (Figure 1). The information on which this model is based comes from a general understanding of relationships between trophic layers in ecological systems, the

author's first-hand knowledge of the other pastoral systems in eastern Africa and data on the Turkana gathered by others, particularly N Dyson-Hudson during his field work among the Turkana. At this stage the model is as general as possible, emphasizing the broad qualitative relationships between the elements of the system, rather than specific quantitative relationships such as food energy flow.

The general questions to be asked of all interactions between elements of the system are, if A and B interact:

Does A enhance B? (represented by \longrightarrow)

Does A inhibit B? (represented by \longleftarrow)

Does B enhance A? (represented by \longleftarrow)

Does B inhibit A? (represented by \longrightarrow)

Any or all of these relationships may exist in the interactions between two elements of the system.

Initially, relationships at the lower levels of the system will be emphasized, as they set the physical constraints within which the social system operates. These are relations between abiotic factors and biotic factors in the ecological system and general relationships between trophic layers.

All the food for livestock and people ultimately comes from nutrients in the soil and energy from the sun, transformed by plants. Plant growth depends on abiotic factors, with carbon, nitrogen, potassium and water making up most of plant tissue. A certain level of understanding of the system as it exists is possible without knowing which abiotic factors in the environment are limiting, but to increase the productivity of the system it is necessary to know the factors which limit plant growth, since plant productivity is almost certainly one factor limiting livestock productivity in savanna environments, including the rangelands of eastern Africa.

Plants are the first trophic layer of any ecological system and directly or indirectly provide food for all consumer organisms. The importance of plants in savanna environments has long been appreciated, and a great deal of effort has gone into studying the vegetation of eastern Africa. Why is it, then, that with rare exceptions the considerable efforts by botanists in classifying plants and mapping habitat types have provided so little information which is useful in understanding indigenous livestock production systems? The answer is because plant taxonomy and

classification of vegetation communities focusses on the vegetation itself, and not on the interactions between vegetation and herbivores.

Studies of the primary productivity of plants and of the nutritional value of different plant species are necessary to provide the information needed to understand herbivore productivity (e.g. McNaughton, 1979). However, precise measurements of primary productivity, of the nutritional value of plants and of exactly what livestock consume are very difficult and time-consuming. If methods could be developed to make sufficiently accurate approximations - for example, if plant productivity over large areas and long periods of time could be estimated by analysis of satellite imagery - this would be a valuable contribution to improved understanding of livestock production systems.

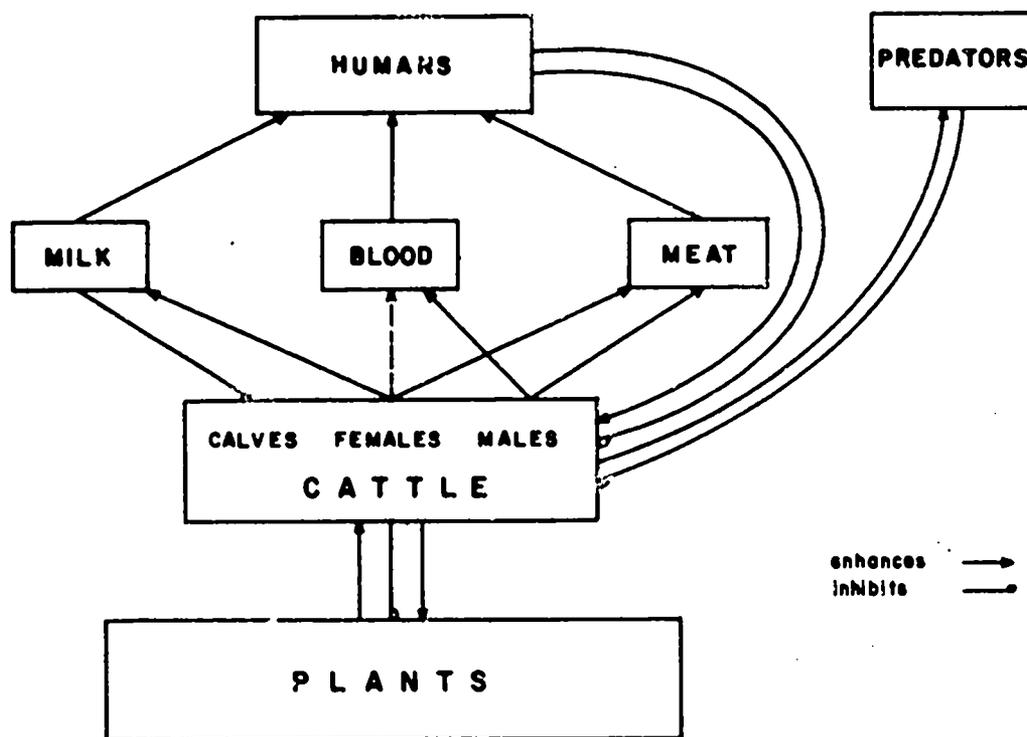
Herbivores form the second trophic layer in the ecological system. In the Turkana area, they include humans, livestock and wild animals since they all eat plants. To develop this section of the model further, information is needed on the extent to which species in the second trophic layer compete for the same foods or eat different foods. This requires studies of the spatial and temporal distribution of different herbivore species and detailed studies of what herbivores actually consume.

People in Turkana are in both the second and the third trophic layers. It is important to learn how much food energy the Turkana gain directly from plants and how much human food is contributed by each kind of herbivore, not just at one point in time, but both under conditions of high rainfall and during times of drought.

The inter-relationships between livestock and people are complex, because livestock support people by providing blood, milk, and meat and people inhibit livestock populations by killing animals and taking blood and milk, yet people also support livestock by protecting them from predators and guiding them to areas of good grazing. Figure 2 illustrates these complex relationships. It is clear that since cattle and other domestic herbivores provide blood, milk and meat to people, the amounts of all three animal products which are taken by the human population must be measured to evaluate the productivity of the livestock production system. Also, if cattle are viewed as a multiple, rather than a single, resource, other important inter-relationships in the total system become clear.

Figure 2

HUMAN-CATTLE INTERACTIONS AMONG THE TURKANA



It is obvious that predators and stock thieves compete with herdsmen for their animals, and guarding herds is in fact a major activity in livestock husbandry. But Figure 2 indicates that calves also compete with people for milk. If people and calves are competitors in indigenous livestock systems, long-term benefits, in terms of increased cattle numbers, must constantly be weighed against short-term benefits, in terms of immediate consumption needs. So decisions concerning the allocation of milk to calves or people become an obvious point of interest - one which deserves detailed study over a long period of time. One way to increase the reproductive rates of herds might be to provide alternative foods, either for the people or the calves.²

² Since the reproductive success of women depends solely on the survival of children, while the reproductive success of men depends on survival of children and the number of wives they can marry, the use of cattle as bridewealth makes it likely that women will be more interested in immediate benefits to their children while men will also be concerned with herd increase.

This very simple model of the Turkana ecological system should be extended and elaborated to include, for example, the effects of variations in time and space on plants, herbivores and people and the effects of plants and animals in altering their environment, both in ways favourable and unfavourable to their own survival.

CONCLUSIONS

This brief discussion of the Turkana shows the complexity of one indigenous livestock production system, and indicates clearly that to understand this system will require long-term research by a number of people, research which must be coordinated within an ecological framework. But, more immediately, it is important for development planners to have some understanding of the livestock production system. Pastoralists in eastern Africa have survived in unpredictable savanna environments for thousands of years, and they probably have developed strategies which balance the aims of maximizing total productivity of the system while minimizing risk. To seek to modify these production systems without understanding them thoroughly is to risk reducing productivity and impoverishing the people.

This does not mean that these systems cannot be improved. Although some stock are traded and grain purchased, the inputs and outputs from most traditional livestock production systems are relatively few. Yet, since pastoralists produce abundant protein and often live near areas where protein is in short supply, increased offtake is a reasonable development goal. However, if the offtake of food energy from one system is increased, greater inputs are required to compensate, i. e. meat is traded for grain. If the productivity of the whole system is to be increased, the limiting factors need to be identified and appropriate action taken. The most effective way to increase offtake may be to provide nitrogen and water for plants, protein supplements for cattle, dried milk for children, milk replacer for calves or reliable springs accounts for the herdowners. But the system cannot be modified intelligently until its current operation is more fully understood.

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