Research Report No. 51

Per Brandström
Jan Hultin
Jan Lindström

ASPECTS OF AGRO-PASTORALISM IN EAST AFRICA

- The Scandinavian Institute of African Studies -
Uppsala 1979

This report has been published in cooperation with SAREC
(Swedish Agency for Research Cooperation with Developing
Countries)

ISSN 0080-6714
ISBN 91-7106-155-X

© The authors and Nordiska afrikainstitutet 1979

Printed in Sweden by
Uppsala Offset Center AB
Uppsala 1979

CONTENTS

1.	THE BACKGROUND OF THE STUDY	7
2.	THE ROLE OF ANIMAL HUSBANDRY IN PASTORAL AND AGRO-PASTORAL SOCIETIES	10
2.1.	Pastoral vis-à-vis Agro-Pastoral Societies	10
2.2.	Pastoral Production	11
2.3.	Agro-Pastoral Production	16
2.4.	Conclusion	21
3.	SPECIALIZATION AND COMBINATION OF AGRICULTURE AND ANIMAL HUSBANDRY	22
3.1.	The interdependence between Pastoral and Agricultural Production	22
3.2.	Case 1: Arusha and Masai	23
3.3.	Case 2: Ankole	24
3.4.	Case 3: Pokot	25
3.5.	Case 4: Sukuma	27
3.6.	Conclusion	29
4.	HOUSEHOLD STRATEGIES AND RESOURCE EXPLOITATION IN AGRO-PASTORAL SOCIETIES	31
4.1.	The Household Strategy, Population Growth and Pressure on Land	31
4.2.	Territorial Expansion	33
4.3.	Intensification	37
4.4.	Complementarity	40
4.5.	Conclusion	42
5.	CONCLUDING REMARKS	44
6.	MAP SUPPLEMENT	47
7.	FOOTNOTES	51
8.	BIBLIOGRAPHY	54

1. THE BACKGROUND OF THE STUDY

In recent years there has been an increasing interest in the study of pastoral societies. The alarming reports of drought disaster in the Sahel-Somalia area have aroused the attention of the international scientific community to the kind of animal husbandry practiced in these areas and to nomadic pastoralism in general. The predicament is becoming increasingly clear to both scientists and planners in the light of research on the physical, ecological and social processes in these societies.

In the study of changing ecological conditions, adaptation and land use systems, the problem singled out has been the growing imbalance in the eco-system. Animal and human populations are growing, and the pasture resources on which they depend are diminishing in terms of both grazing areas and range productivity.

Today it is commonly accepted that desert encroachment and land degradation in arid and semi-arid areas are mainly man-made, resulting from deforestation, overcultivation and overgrazing (A. Rapp et al. 1976). The first step in the process causing desertification is often the degradation of forest vegetation, a process which generally gives rise to different types of steppe-like eco-systems.¹⁾

Ecologists maintain today that knowledge of the processes causing desert encroachment and even of technologies for restoring desertized areas seems fairly adequate (H. N. Le Houérou & A. Rapp 1976). The current need is for more information on the interconnection between ecological and socio-economic systems in these areas. It is often stated that insufficient attention has been paid to the socio-economic and cultural context (H. N. Le Houérou & A. Rapp 1976, Brinck 1976). To tackle this problem there is a need for a varied approach since the current situation has been brought about by a range of factors. No single factor can explain the crises which pastoral societies are currently undergoing. An explanation must be sought partly in relationships intrinsic to pastoral production systems, partly in external factors pro-

duced by the changing economic, political, administrative and natural environment (J. Copans 1975, C. Meillassoux 1974, Mazingira 2, 1977). In the current discussion of the role of animal husbandry in the process leading to land degradation and desert encroachment the emphasis has been on nomadic pastoral societies where the population mainly subsist on their herds and flocks. Here the dominant form of land use is grazing on natural pasture. Agriculture, when practised, is only a supplementary economic activity.

In the discussion comparatively little attention has been devoted to areas and societies where animal husbandry, although important, is rather a complement to agriculture. The focussing on animal husbandry in the most arid areas where there is little or no agriculture has tended to over-shadow the need for investigation of the ecological and socio-economic linkage in the semi-arid and subhumid areas: those areas in which animal husbandry occurs in combination with agriculture. This may be because in the former areas urgent measures are required to bring a rapidly deteriorating situation to a halt, and to re-direct development. This matter of urgency must not, however, lead to a neglect of the agro-pastoral societies: those societies where agriculture constitutes the subsistence base but combines with livestock keeping in such a way that the latter is a necessary condition for the maintenance and reproduction of the socio-economic system.

In many African countries most cattle are kept by sedentary, mainly agricultural people and not by nomadic pastoralists. In East Africa more than 70 per cent of the total herd is kept by sedentary agro-pastoralists (K. Meyn 1970: 25). Although the man/animal ratio ²⁾ is considerably lower among 'purely' pastoral people than among agro-pastoral, the combination of the two economic pursuits, agriculture and livestock-keeping, often leads in the latter case to a higher grazing density. The fact that agro-pastoralists generally live in areas with comparatively favourable natural conditions does not always compensate for the devastating effects on the environment caused by the fairly intensive mode of

exploitation. The threat of land degradation and, ultimately, desertification is always present even in such areas. So there is a need to increase our knowledge of a/ areas where the degradation to secondary eco-systems is more or less controlled, but where the internal dynamics of the socio-economic system, and its external influences, make the balance precarious; b/ areas in a state of incipient ecological imbalance or in an already critical stage; and c/ the socio-economic contexts generating such states. Often the hazards of over-grazing and grass burning practices have been observed by ecologists and planners. But a thorough understanding of the dynamics of animal husbandry and its place in the total system of agro-pastoralism is still lacking.

In this report, however, which is a pre-study to a more comprehensive study of agro-pastoral societies in Eastern Africa³⁾, the scope is restricted to aspects of production and resource utilization in this type of society. We argue that there are important differences in principle between pastoral and agro-pastoral systems of production, and we base our argumentation on the different role ascribed to animal husbandry in the two types of societies. Little attention is paid at this stage to the importance of cattle in the reproduction of the social system. Further, we omit a number of important factors such as the influence of colonial and national policies and the expansion of the market. In chapter 2 we discuss some basic characteristics of agro-pastoral systems of production in contrast to pastoral systems of production. In chapter 3 we take up a few cases to demonstrate some historical solutions to the problem of combining the two spheres of production, agriculture and animal husbandry. In doing so we move along a 'continuum with a case of 'pure' pastoralism, the pre-colonial Masai, as one extreme and a case of an integrated agro-pastoral household economy, the Sukuma, as the other extreme. In chapter 4, finally, we discuss different household strategies with special reference to population growth and pressure on land. We do not present a thorough coverage of these aspects, neither theoretically nor empirically. The intention is rather to raise questions for further research.

2. THE ROLE OF ANIMAL HUSBANDRY IN PASTORAL AND AGRO-PASTORAL SOCIETIES

2.1. Pastoral vis-à-vis Agro-Pastoral Societies

In the last years several important works on pastoralism and pastoral societies have been published.⁴⁾ A number of commissions and work groups such as the Commission on Nomadic Peoples, the Equipe Ecologie et Anthropologie des Sociétés Pastorales and, in the field of development planning, the Agricultural Administration Unit Design and Management of Pastoral Development of ODI (Overseas Development Institute) and ILCA (International Livestock Centre for Africa) have been organized. The vital development and the need for communication between various groups and individual scholars is reflected in the number of bulletins and newsletters which have appeared during the last few years.⁵⁾

Investigations and research on African pastoralism is today in full progress. Because of the drought and the problems of desertification, most current research focuses on pastoral nomads. However, the terms pastoralism and pastoral societies are not unambiguous. We have, for example, a/ highly specialized societies like the Masai and the Samburu, who practice little or no agriculture and have as low a ratio of man/cattle as 1:15. But there are also b/ other societies which are usually labelled as pastoralists, like the Jie and the Karimojong, where agriculture is an important supplementary economic activity (P. Bonte 1973:74, K. Meyn 1970:10). Further, there are c/ societies in which agriculture is the main subsistence activity, but where animal husbandry is an integral part of the economy, and where the herds are of a considerable size. (In the cases discussed in this report man/animal ratio is around 1:1.)

In what follows we will refer to the societies of type a/ and b/ as pastoralist, and the societies of type c/ as agro-pastoralist.

The terms pastoralism and pastoral society are generally used rather intuitively to denote a great variety of herding practices on natural pasture and economies that derive the bulk

of the food supply from domesticated animals. ⁶⁾ The mobility criterion is often used in making subdivisions such as nomadism, semi-nomadism and transhumance. ⁷⁾ The presence or absence of agriculture is also a common criterion: where it exists at all, agriculture in pastoral societies is limited in scale. Some anthropologists dealing with East-African cattle-keeping employ the term pastoralism to any society which practises animal husbandry. ⁸⁾ However, there is an agreement on the importance of studying pastoral production. In the work of Dahl & Hjort (1976), for example, animal husbandry is studied in a purely pastoral context, i.e. herd growth and household economy with reference to the natural reproduction rate of the herd in a given ecological niche and organizational set-up.

The study of animal husbandry in agro-pastoral societies has not, however, received the same attention as that of pastoral societies. This is the more surprising as the stock kept by agro-pastoralists in many of the North Eastern, Eastern and Southern African countries makes up the bulk of the total livestock population. This situation may be due to social scientists not analyzing agro-pastoralism as a specific system of production. There would seem to be an assumption that only one basic model is applicable to animal husbandry in pre-industrial societies, i.e. a model developed from the study of pastoralists proper.

To conclude, the apparent similarities between animal husbandry in pastoral and agro-pastoral societies must not obscure the fact that there are important differences in principle between these two types of systems of production.

2.2. Pastoral Production

There are no pastoral societies which subsist exclusively on pastoral products, although there may be groups within a society which during certain periods consume no vegetarian food (e.g. the warriors among the Masai). ⁹⁾ On the contrary, there are even pastoral nomads, for which cereals constitute the bulk of the food consumption (T. Asad 1970:30, J. Nicolaisen 1962:200). The specialized production of pastoralists and the

subsequent deficiency in grain necessitate the production of a pastoral surplus which can be sold or bartered in exchange for cereals. It follows that, the existence of societies producing an agricultural surplus is a necessary condition for pastoral specialization.¹⁰⁾ To illuminate these interdependencies, we will briefly consider in chapter 3 some case studies of the relations between pastoral specialists, and cultivators.

In pastoral societies livestock have an immediate function as a means of subsistence in the provision of dairy products, meat and blood, as well as being a means of exchange in obtaining agricultural and other necessary products. In addition, livestock, especially cattle, being the centre of social and ritual life, have great symbolic value. Animals are given as prestations to legitimize marriages, to meet social obligations, and are consumed at ceremonial occasions and feasts. Livestock represents wealth, and as it is unequally distributed within the society, it also plays a significant part in the process of social stratification. Control over cattle and transactions of cattle are instrumental in creating relations of dominance and dependence such as patron-client relations. They are also used in social transactions to create alliances between individuals and kinship groups. Moreover, in the event of disease or drought cattle losses can only be compensated for by support from kinsmen and through institutionalized forms of cattle loans and gifts.

The pastoral household is totally dependent for its physical and social maintenance and reproduction on two basic resources: the herd and the family labour. Thus, the question of herd management is crucial in the study of this kind of economy. An analysis of herd management, in turn, requires consideration of herd and household composition, as well as the organization of labour. Herd composition is the proportion of animals of different age and sex in the herd, the ratio of lactating cows to the number of heifers, bulls, oxen and calves, since cows provide milk during the rainy season and oxen and bulls blood and meat during the dry season.¹¹⁾ Consequently, pastoral households have to strike

a balance in the relative proportion of different categories of animals in order to optimize production capacity.

The herd composition is, of course, to some extent dependent on the number of people exploiting the herd. There is an apparent interdependence between the household group as a labour force and consumption unit, and the herd as means of subsistence. A household with too many people in relation to the herd must come to grips with this situation either by pushing out some of its members or by acquiring more livestock. Different ways of dealing with this situation are well documented. Institutions such as bond-friendship, stock-friendship, and stock-associations can be seen as a means by which cattle are re-distributed from surplus to deficiency households. ¹²⁾

Under some circumstances it is necessary for one stock exploiting unit to split up its herd into two, a household or milch herd, kept in the vicinity of the homestead, and a camp or fallow herd, grazed far away from the main settlement. ¹³⁾ Animals are continuously being circulated between the two herds in order to assure optimal output of the milch herd. ¹⁴⁾

To sum up, in a pastoral society it is vital to achieve a certain correspondence between household and herd composition. This is a recurrent theme in literature on pastoral societies. Among the Karimojong, for example, the 'size of the herd and the size of its associated family are ... interdependent features at any time; and seen through time, fluctuations in herd size and the process of family development are also interdependent' (N. Dyson-Hudson 1966:51). In other words, 'ecological factors require herd extension to keep pace with family development; social factors influence family extension to the limit of cattle surplus' (N. Dyson-Hudson 1966:84).

Few households, of course, strike the ideal balance. And for those who manage to do so, the developmental cycle of the household and the hazards of drought and disease may easily upset the balance. To meet the labour requirements with respect to the herd and the consumption needs of poor individ-

uals and households, there is a constant flux of labour and cattle within the society. For example, among the Karimojong,

a man wealthy in cattle may permit a pauper to settle in his temporary camp and be supported in exchange for herding labour. The arrangement is relatively one-sided since the pauper is seldom if ever given any property, only food and shelter.

(N. Dyson-Hudson 1966:85)

In the case of the Rendille,

the situation in which there are a considerable number of unusually rich men and also of unusually poor men leads to a system of clientship in which the poorer men are attracted to the service of the richer to help them herd their camels. Poorer men would normally be expected to manage the herds of their closest agnatic kinsmen who would often be their elder brothers.

(P. Spencer 1973:40)

A second consideration in herd management is the organization of labour (within the household). This is largely dictated by the kind of animals in the herd, the number of animals and the herd composition. Generally, the herd exploited by a family is owned by a single man. It may be argued that it is misleading to talk of individual ownership in its strict sense, partly because a number of people often have rights in the herd, partly because the herd exploiting unit as a whole subsists from the same pool of resources. Ph. Gulliver treats this complicated situation by making a distinction between legal and social rights in cattle and animals,

for both Jie and Turkana there are two distinct aspects of livestock as property - one, legal, and the other social. (Ph. Gulliver 1955:262)

By this form of stock-ownership there are no legal rights in a herd beyond those of the 'owner' and his (or their) wives and children. It is this form of legal ownership which establishes the independence of the stock-owning units in each tribe.

From the non-legal point of view, however, there is a wider range of what may be called 'social' rights and obligations which are not sanctioned by force....' (Ph. Gulliver 1955:264)

Nevertheless, the family head is often the only one who has the right to administrate the utilization of the herd and he

is thus the one who administrates production. The right to make use of the animals for special purposes can, however, be delegated to other persons, especially to other members of the herd exploiting unit, who thus obtain rights of production over part, or the whole, of the herd. ¹⁵⁾

No man on his own can manage this type of herd. He needs at least another two or three people with whom he can share the task. The polygynous situation, with extended family households or full brothers living together, can be seen as one solution to this problem. ¹⁶⁾ The Rendille case points at another solution, that of camel herders, mainly monogamous, living in large, often clan-based, settlements, with extra labour available outside the immediate household (P. Spencer 1973:49 et passim).

However, as outlined above, the question of household composition and labour organization, as well as that of circulation and exchange of livestock, cannot be treated in isolation from the kinship system. An analysis of this system is therefore basic to the comprehension of the herd management problem.

The kinship system is articulated through cattle and cattle transactions. The giving and taking of cattle creates alliances between individuals and groups. Most cattle transactions follow kinship lines. It is the exchange of cattle and other livestock along these lines which gives the kinship system its importance. This network can be seen as a way of regulating the relations between the number of cattle in the herd, the labour force and the number of people who depend on the herd. It is also by means of cattle that a man establishes marriage alliances, obtains his wife and becomes the founder of a family. ¹⁷⁾

Thus the interdependence of cattle and kinship is of a complicated nature. On the one hand, kinship ties are created by cattle transactions. On the other hand, cattle circulate between the herd exploiting units according to kinship ties. That is, the kinship idiom dictates to whom cattle should be given and from whom they should be received. Kinship is thus

expressed through the giving and taking of cattle. As reported by Gulliver, one Turkana explained that '... a mother's brother who refuses to give you animals when you need them is as if he were not a kinsman any longer...' (Ph. Gulliver 1969:35).

In short, animal husbandry in pastoral societies is geared to the reproduction and growth of the herd; the herd exploiting unit has to reproduce the herd over time to maintain its physical and social existence. The high degree of specialization necessitates a surplus of animals which can be exchanged for goods produced outside the pastoral economy.¹⁸⁾

Herd management is geared to optimize the natural reproduction of the herds and flocks. The herds are important as the basis of subsistence and at the same time they constitute the basic form of wealth. Animals also play a vital part in creating and maintaining social relations (bridewealth, kinship and social obligations) and, ultimately, in reproducing the social system as a whole. Unsuccessful herd management, and losses through disease or drought, are compensated for by support from kinsmen and through institutionalized forms of cattle loans and gifts.

2.5. Agro-Pastoral Production

In agro-pastoral societies agriculture constitutes the basis of the economy. Consequently, the practices and strategies of animal husbandry in these societies differ in a number of important aspects from those in pastoral societies. Further, the dominant role of agriculture in the economy also makes for different organizational set-ups.

Agro-pastoralists usually subsist in less arid regions than pastoralists and, as a result, movements of their herds may be more limited. It must be stressed, however, that this does not necessarily imply herding practices in which the herds are kept stationary in the vicinity of the homesteads. If we focus on the dimension of space and look at how the animals are localized at various times of the annual cycle, we can in the case of agro-pastoralism distinguish a wide range of herding practices:

1. unilocal systems: the herd grazes in the vicinity of the

homestead and is normally taken back to the kraal every night.¹⁹⁾

2. bilocal systems: a) part of the year the cattle are herded as in case 1, but during the other part the herd is moved to range-lands which provide seasonally more favourable pasture than the region of the homestead (i.e. a practice usually referred to as transhumance); b) a few cattle are kept at the homestead, but the majority of the herd is kept permanently at special cattle posts at a considerable distance. Grazing is on natural pasture, mainly on land unsuitable for agriculture.

3. multilocal systems: a few cattle are kept permanently at the homestead while the major herd is throughout the year grazed far away from the permanent settlement, but in a more 'nomadic', migratory way than in case 2.

Agro-pastoral societies have much higher densities of both human and livestock populations than pastoral societies. Among agro-pastoralists the highest livestock density in relation to available land is found in areas where unilocal agro-pastoral systems dominate, such as the South-Western part of Kenya and the area south of Lake Victoria in Tanzania (Cf. Maps No 1 and 2).

As the herds of agro-pastoralists are on average smaller than those of pastoralists, and the movements of their herds in general more restricted, especially in the case of unilocal herding systems, herding is less labour intensive in agro-pastoral contexts. Moreover, as the man/animal ratio is comparatively high, usually around 1:1, a relatively small proportion of the available labour force has to be allocated to the livestock sector. Thus, the agro-pastoral household is less vulnerable to deviances in the ratio manpower/herd size. Moreover, an agro-pastoral household may well eke out its existence for a time without any livestock at all, and the relative distribution of cattle seems to vary from one society to another.²⁰⁾

As agro-pastoralists derive the bulk of their subsistence from agricultural production, they pay less attention to the quality and composition of their herds than do the pastoral

specialists. One indication is found in the difference of attitude to selective breeding; the proportion of castrated animals is generally much higher in pastoral than in agro-pastoral societies (Table 1.).

Table 1. Herd Composition in some Pastoral and Agro-Pastoral Societies

	Pastoral societies		Agro-Pastoral societies	
	Sebei	Karimojong	Gogo	Sukuma (Kwimba District)
	%	%	%	%
Calves, heifers and cows	70-80	65-75	88.5	82.5
Bulls	3-6	10-15	7.5	14.5
Bullocks	17-24	15-20	4	3

(Sources: W. Goldschmidt 1976:113, N. Dyson-Hudson 1966:54, P. Rigby 1969:46, von Rotenhan 1966:56)

In agro-pastoral societies most of the labour is invested in agriculture. Successful cultivators who produce a surplus convert much of it into livestock; surplus from the agricultural sphere is thus channelled into the livestock sphere.

In building up a herd, the owner relies on the natural reproduction capacity of the animals. But, in contrast to the specialized pastoralist, he also relies on agricultural surplus production as a vehicle for the accumulation of livestock. The Turu homestead for example 'produces the staple food - principally millet - to feed its members, and it has as its primary aim the production of surplus for sale to another homestead that desires it in exchange for livestock' (H. Schneider 1970:61). Rigby finds the same strategy among the Gogo, where, 'after a series of good crops, wealth in grain is converted immediately to livestock by trading' (P. Rigby 1969:54).

To illustrate the process of livestock accumulation and its linkage to agricultural production we shall consider a case from the Sukuma in Tanzania (Brandström 1976:41-46). The case

is of a Sukuma farmer who started to clear the bush in an uninhabited area in the beginning of the sixties and successively achieved considerable prosperity. The case is described in detail as it shows the economic strategy, the way in which resources are built up, and how the surplus is put to use. As for the degree of the farmer's success, the case is an exceptional one, but the process throws some light on the character of an agro-pastoral economy.

The farmer, who was 50 years old, moved together with his wife, from a densely populated area in the northern part of Mwanza Region in 1961. The reason for moving was lack of land in the home village. They moved to a sparsely-populated area in the southern part of the region and started to clear the bush on a hill slope facing a vast plain. Having established his homestead, the farmer brought his children, his few cattle and remaining property to the new location.

In the third year the farmer was able to summon a work group of ninety men from a dance society, to which he himself belonged. Such societies, common among the Sukuma-Nyamwezi, also function as cooperative work associations. A large area of bush was cleared on this occasion. For this the farmer paid Shs. 500 and 5 head of cattle. With five of his seven children and his wife, he planted a few acres of cassava and some ten acres of cotton on the cleared land. From the harvest, the farmer was able to save an amount of money that enabled him to buy eight bulls and a plough.

Having acquired draught animals and a plough the farmer was able to expand his farm to the heavy soils of the valley. The more he was able to plough of these soils, the more he switched over from cotton to maize and grams, this combination making bi-annual harvesting possible. Year by year the area under cultivation was expanded. More and more people moved into the area but there was still no scarcity of land. In the seventh year the farmer hired a tractor for ploughing some twenty acres. The surplus from this was invested in further tractor ploughing, in cattle and in work group parties for planting, weeding and harvesting. In 1971 the farmer was able to buy a tractor. In late 1975 he was farming some 60 acres of maize and grams,

some 10 acres of sorghum and 8 acres of cotton. He owned 77 cattle and 10 sheep and goats. His household consisted of 20 persons: he and his wife, three sons, two daughters-in-law and thirteen grand-children.

The cattle of the herd were obtained as shown in table 2.

Table 2. Cattle acquisition

	A	B	C	D	E	F	TOTAL
Calves	12	-	-	-	-	-	12
Heifers	4	11	1	8	1	-	25
Cows	6	5	-	5	4	4	22
Bulls	2	1	-	2	2	-	7
Bullocks	2	2	4	-	5	-	11
	26	19	5	15	10	4	77

A	Born in the kraal of the homestead
B	Purchased from local traders
C	Purchased at the livestock market
D	Cattle exchanged for maize
E	Cattle received as payment for tractor hiring
F	Cattle received as bridewealth

Only 26 cattle of the whole herd, containing 77 animals, were born in the kraal of the homestead. The remaining 51 animals were obtained through exchange and purchase. The majority of these 51 animals were acquired during the last two years. Almost half of the herd was accumulated during this period, as a result of the large surplus extracted from the agriculture. Table 3 shows the number of cattle and how they were acquired during this period.

Table 3. Cattle Acquired in 1974 and 1975

	A	B	C	D	TOTAL
Heifers	11	1	7	1	20
Cows	-	-	-	5	5
Bulls	1	-	2	1	4
Bullocks	2	4	-	2	8
	14	5	9	7	35

A	Cattle purchased from local traders
B	Cattle purchased at livestock markets
C	Cattle exchanged for maize
D	Cattle received as payment for tractor hiring

As already mentioned, this farmer is an exceptional case as to the degree of his success but not as to the way he makes use of his surplus. The case illustrates a strategy that is common among agro-pastoralists and that can be conceived of as follows: agricultural products invested in livestock, livestock reinvested in agriculture etc. The linkage between agriculture and livestock production may, however, be articulated in a number of different ways. Our attention will be devoted to some of these in the chapters following.

2.4. Conclusion

Even a very brief comparison, like the one above, makes it possible to make some propositions about the importance of cattle and about similarities and differences between pastoral and agro-pastoral systems of production. The specialized pastoralists have to produce a surplus to obtain agricultural products which they do not produce themselves, but, equally important, a part of the surplus is used for the reproduction of the social system through, for example, gifts, loans, bride-wealth, sacrifices. The agro-pastoralists build up their herds mainly by converting agricultural surplus to cattle. The animals, in turn, may often be used to increase agricultural productivity (labour, draught animals, manure). Moreover, they are important in the consumption sphere, they can be exchanged for consumption goods, and, like in pastoral societies, they

play an important part in the reproduction of the social system. The most important difference between the two types of societies is in the method of building up herds. The specialized pastoralists have to rely entirely on the natural reproduction of the herds and their productive activity is directed to optimize herd growth. Somewhat simplified, the pastoralist strategy may be represented in the following way:

The agro-pastoralists too, of course, base the growth of their herds on their natural reproduction capacity. Being less specialized, they often have a much lower rate of efficiency and success than pastoralists. But they have an additional resource, and the most important, agricultural production; the agricultural surplus is to a large extent invested in livestock. Their strategy, therefore, may be represented in the following way:

3. SPECIALIZATION AND COMBINATION OF AGRICULTURE AND ANIMAL HUSBANDRY

3.1. The Interdependence between Pastoral and Agricultural Production

We have earlier in this report (p. 11) drawn attention to the fact that there are no pastoral peoples in Eastern Africa today who subsist exclusively on livestock products. Thus, specialized livestock production necessitates the production of a surplus which can be converted into agricultural products.

Pastoral production is always in one way or another linked to agricultural production, and access to agricultural surplus products is indeed a precondition for pastoral specialization. Moreover, when we speak of specialization, we must keep in mind that this is always something relative; most societies labelled 'pastoralist' in the parts of Africa we discuss here, do in fact also practise some agriculture. The combination of pastoralism and agriculture can be viewed as a continuum, with 'pure' pastoralism and 'pure' agriculture respectively as the logical extremes.

We have previously stated that the pastoral household is typically dependent on the agricultural surplus production of others to meet its subsistence demands; at most it is self-subsistent in agricultural products. The successful agro-pastoral household is not only self-subsistent in agricultural products, it also strives to produce a surplus in the agricultural sphere and to convert this into livestock. In order to demarcate agro-pastoral systems of production we will proceed along the above-mentioned continuum from highly specialized systems of production to mixed systems of production and discuss some types of interdependencies between agriculture and animal husbandry.

3.2. Case 1: Arusha and Masai

Beginning at the pastoral extreme of the continuum, we may state that pastoral specialization has bearings on the division of labour not only within the household and the local community, but also on the macro level; there have always been different modes of local and regional exchange, even before these societies were linked to the national and international network of market exchange. We re-emphasize that even if many societies, predominantly in arid regions, are more or less exclusively oriented towards pastoral production, agricultural products still constitute an important part of their consumption.²¹⁾ The exchange relations which developed between the Masai and the Arusha during the last century are chosen to illustrate this kind of regional interdependence and exchange.

Though Arusha had little or no domestic livestock, milk, meat and skins still played an important part in their consumption. On the other hand, they produced substantial amounts of cereals, gourds, tobacco and honey for which the neighbouring Masai were prepared to barter (Ph. Gulliver 1962). The pastoral Masai grew no cereal or vegetable food at all. Though the diet of the Masai warriors consisted exclusively of meat, milk and blood, children and married people, who composed the bulk of the population, had a mixed diet of vegetarian food and animal proteins. This situation created conditions for an inter-ethnic exchange in which the Masai, although specializing in purely pastoral production, could sustain their total subsistence and way of life. In this case then, we find a division of labour between two ethnic groups, and exchange relations between two societies.

5.3. Case 2: Ankole

In the pre-colonial kingdom of Ankole there was a specialization of production between two groups within the same social formation. Here the Hima pastoralists constituted an aristocracy dominating the agricultural Iru, who were excluded from access to cattle.

But within Hima society there was also a strict separation of rights and duties in that women were strictly prohibited from having anything to do with cattle. The pastoral aristocracy was in the past closely associated with the royal power in Ankole through links of marriage and cattle clientship (K. Oberg 1970). The Hima tried to exploit as much land as possible for grazing, and prevent it from being used in agriculture by restricting the movements and settlements of agriculturalists (Y. Elam 1973:6). A strict rule of endogamy and a strong ideology of superiority combined with avoidance and taboos marked off the Hima from the subordinate Iru, and contributed to maintaining the political system and the almost cast-like social stratification. Elam, commenting on the situation in the sixties, states:

This is not to say that there is no cooperation at all between Hima and Iru; a certain amount of it is inevitable. Indeed

herdsmen cannot live without receiving certain products and services from cultivators. In addition to a few agricultural foodstuffs, tobacco, and, most important, beer, all of which must be acquired by the Hima from the Iru, the latter are also the only craftsmen in Ankole. /.../ For their products and services cultivators are rewarded with meat and butter and, nowadays, also with ready cash, which the Hima derive from the sale of bulls in the market. (Y. Elam 1973:7)

Historical, political and ideological factors contributed to maintain the occupational specialization between two endogamous, ethnically distinct groups, which both occupied the same ecological zone and lived within the same society. The exclusion of the Iru from the cattle sphere and the articulation of the relations of exchange and co-operation between the two groups is such that the concept of class relations has been suggested (K. Oberg 1970, P. Bonte 1976).

3.4. Case 3: Pokot

The two preceding cases, the Masai and the Hima, illustrate a pastoral specialization along ethnic lines and relations of exchange between ethnically distinct groups. In the first case exchange of pastoral for agricultural products takes place between two societies, in the second case within one and the same society.

However, the existence of various ecological zones within a limited geographical area has sometimes given rise to a specialization between sections of one ethnic group within one and the same society. This is often the case in regions where we find, on the one hand, highland areas or mountain slopes with sufficient rainfall for agriculture and, on the other hand, lowland areas which are too dry for agriculture but suitable for livestock keeping. This situation may be schematized in the following diagram:

Figure 1. Generalized Altitudinal Profile in East Africa
showing Relationships among Rainfall, Elevation and Crops

(After Ph. Porter 1965:410)

Ecological conditions of this kind are found in many parts of East Africa. In a number of cases a relative specialization of agriculture and animal husbandry has developed within one and the same ethnic group, for example, the Hehe of the Iringa Region of the Southern Highlands of Tanzania, the Kamba of Southern Kenya, the Sebei of Eastern Uganda, and the Pokot of Western Kenya.

We shall use the Pokot as an illustration of this kind of specialization (R. Edgerton 1971, Ph. Porter 1965, F. Conant 1965, C.G. Widstrand 1973). Parts of their territory are very steep. There are two well-demarcated ecological zones; the hot arid lowlands, *Kec'gh* and the well-watered highlands, *Manob*.

In his study of the Pokot, R. Edgerton compares two local communities, one in the highlands (Ngelani) and the other in the lowlands (Masol). In the highland community of Ngelani, at an altitude of about 1,300 meters, agriculture is the basis of subsistence. People cultivate millet, sorghum and maize, but they also keep livestock, about 1.35 units per person (R. Edgerton 1971:84). In the lowland community of Masol, at an altitude of about 600 meters, the people mainly depend on their

herds of cattle, sheep and goats, but also keep some donkeys and, occasionally, camels; Edgerton estimates the man/livestock ratio to 1:5 (R.B. Edgerton 1971:85).

These two specialized sections of the Pokot are dependent on each other for their subsistence. The Pokot are organized in localized social units, called *korok*, which provide the framework for the transaction of products between the two ecological zones. For example, the pastoral *korok* are 'dependent upon grain obtained from highland farming Pokot in exchange for products of their herds' (R. Edgerton 1971:85). Apart from these economic transactions, affinal ties between the two types of *korok* play an important part in directing the flow of products. For example, a pastoralist

is said to have chosen wisely if two of his wives are from widely separated *korok* in the mountains - one from a region in which crops are harvested early and the other from an area where they are harvested late, thereby assuring the exchange of pastoral products - meat, milk, skins - for farm products (especially grain, tobacco and gourds) over more than one harvest period.
(F. Conant 1965:432)

The Pokot case illustrates specialization and exchange relations between households occupying different ecological zones. As animal husbandry plays a prominent part in the economic activity of the highland households (a man/animal ratio of 1:1.35), the system of production of the highland Pokot may be conceived of as a variant of agro-pastoralism. The point we want to stress, however, is that we have here a case of pastoral specialization and exchange within the total economic, political and ritual system which constitutes Pokot society. In a more typical example of agro-pastoralism, there is no articulated specialization outside the domestic group.

3.5. Case 4: Sukuma ²²⁾

The Sukuma occupy the area south of Lake Victoria. Though agriculture is the main subsistence activity, animal husbandry is of utmost importance. About one third of the national herd is found in this area, that is more than 3 million heads of cattle. ²³⁾ Thus land, cattle and labour constitute the main components of an economic system the basis of which is agri-

culture founded on family labour. The surplus is invested in cattle, which, in turn, are necessary for marriage and thus for the expansion of the family labour force. Agricultural success and successful herd-building enable the household head to attract additional labour, through marriage or by other means (cf. p. 18ff.), and thus increase the production potential of the family.

Livestock ownership is not, however, evenly spread; the proportion of families owning cattle varies considerably from area to area (in Mwanza Region, for example, between 20 to 60 per cent). Thus there are areas where the majority of households do not possess cattle. Nevertheless, most people will, in the course of their life cycle, have to acquire cattle as they are needed in a number of important social transactions. As a result, there is, for each household a strong social impetus, as well as the apparent economic one, to accumulate cattle, so that there is a considerable flow of cattle between households. However, there is no section or subgroup of the Sukuma specializing on pastoral production only, as in the case of the lowland Pokot. Whether the rate of cattle ownership is high or low, livestock keeping always goes together with agriculture within the framework of individual households.

In societies with highly specialized livestock production, management practices are often moulded over time in a rather rigid form with well-defined division of labour between men and women, age-classes, ethnic groups and sub-groups etc. In many agro-pastoral societies this is a less conspicuous feature. Among the Sukuma, for example, there is no strict division of labour between men and women, different age-groups, or sections of the local group, regarding livestock. Management practices may differ considerably between one household and another depending on the size of the family, the settlement pattern, and the possibility of cooperating with neighbours. This is not to say that there are no established preferences and practices as to who should do what, but decisions about division of labour are to a high degree made within the particular households and flexibly adapted to circumstances.

This type of system makes for a rather low degree of special-

ization outside the domestic unit. As for exchange relations there is of course an inter-household exchange. Much livestock is still acquired from neighbouring peoples with a more specialized livestock production. Especially in times of sharp reductions of the stock caused by natural disaster or outbreaks of disease this is an apparent feature. The rate of rebuilding the herds in a given area will often be much faster than what natural reproduction and neighbouring Sukuma areas may cater for.

To sum up, we may argue that in the Sukuma case livestock keeping and agriculture must not be conceived as separate and different spheres of the household economy, but rather as constituent parts of an integrated whole.

5.6. Conclusion

In this brief comparison we have moved from specialized systems of production to mixed systems of production and we have discussed four types of solutions to the problem of linking animal husbandry and agriculture. In the case of the Arusha and the Masai, occupational specialization is related to the fact that the two groups occupied different ecological zones. In the kingdom of Ankole it was mainly political and ideological factors which contributed to maintain the occupational specialization; the control over cattle was monopolized by the politically dominant group. Although this was a case of a society with both agriculture and animal husbandry, the social division of labour prohibits its inclusion under the agro-pastoralist category as defined. Among the Pokot one segment of the population is agro-pastoral and another pastoral. Occupational differences are based on ecological factors, but in contrast to the Masai-Arusha case they are not related to ethnic boundaries. Among the Sukuma there is no articulated specialization of animal and crop production outside the domestic group. As we have shown, there is a considerable portion of households without cattle, but this is not the result of an institutionalized division of labour. There are rich households with large herds and poor ones with few or no animals. But livestock ownership is not monopolized by anyone group in the society, there being a constant flow of cattle

between domestic groups. Moreover, successful herd-building never results in pastoral specialization; animal husbandry is always combined with agriculture within the framework of the individual household. Figure 2 summarizes the four cases discussed above.

Figure No. 2. Specialization and Combination of Agriculture and Animal Husbandry within Different Social and Ecological Frameworks

Case 1: specialization and exchange between two ethnic groups occupying two different ecological zones and organized in two distinct societies.

Case 2: specialization and exchange between two ethnic groups (one of which politically dominates the other) within one and the same society and often occupying the same ecological zone.

Case 3: specialization and exchange within one ethnic group in one society but with different segments occupying different ecological zones.

Case 4: one ethnic group, one society, and one ecological zone, with no institutionalized specialization outside the domestic group, and no institutionalized exchange between groups or segments of the population.

1. HOUSEHOLD STRATEGIES AND RESOURCE EXPLOITATION IN AGRO-PASTORAL SOCIETIES

4.1. The Household Strategy, Population Growth and Pressure on Land

A typical agro-pastoral household starts with few or no cattle, subsists mainly on agriculture, and devotes most of its labour to agricultural production. Households in the early phase of their developmental cycle satisfy their needs of livestock in a number of ways, for example through various forms of institutionalized cattle loans (H. Schneider 1968:427). During the course of its existence the individual household strives to establish a dynamic relation between the two spheres of production. The household which succeeds in producing an agricultural surplus converts this into livestock which, can be used to attract more labour and thus obtain a larger agricultural output. Animals, in particular cattle, may be converted into (female) labour through bride-price and marriage which, in turn, may lead to increasing agricultural production. Livestock is also used to maintain and re-activate bonds of kinship and friendship and to create new social and political alliances. The cycle is closed at the death or retirement of the household head, when his household is dissolved and the family herd distributed according to existing inheritance rules.

This means that at any given time there are households with few or no animals and households which are rich in livestock. But this does not necessarily imply that all these societies are class societies. Certainly, livestock is the main form of property and generally the only form of storable wealth, but redistributive mechanisms circulate cattle in the social system. Furthermore, livestock is a perishable form of property sensitive to natural disasters which means that a large fortune can be reduced to nil at a single stroke.

However, when the total population increases and land resources become scarce, individual households often face problems in implementing the above-mentioned strategy. Equally often the agro-pastoral mode of subsistence provides possibilities to overcome environmental constraints and the problems

that go with increasing pressure on natural resources. For example, in large areas of Tanzania, which have been practically uninhabited because of tsetse infestation, the two spheres of production have interplayed dynamically in opening up new land: pioneering slash-and-burn farmers clear new land for cultivation and settlement and transform the bush and forest to a habitat suitable for livestock. In areas where the pressure on agricultural land is high, cattle, or more specifically their manure, may be an important part in maintaining the fertility of the soils (cf. below p. 37ff.). In certain arid regions where agriculture is precarious, the combination of agriculture and livestock keeping can maintain a larger population than would have been the case if there had been pastoral specialization exclusively (cf. below p. 40ff.).

The problems of pastoral and agro-pastoral adaptation under population pressure have been discussed by G. Haaland (1977). He contends that pure pastoralism is 'self-regulatory with reference to maintenance of carrying capacity' of grazing land, while 'mixed farming and pastoralism' is not so. His point of departure is that, as pastoral societies are totally dependent on the exploitation of one set of resources, livestock and pasture, it is necessary for these societies to maintain the ecological balance and the carrying capacity of land. As a consequence, pastoral systems have to be self-regulatory with reference to carrying capacity, otherwise the basis of their subsistence is bound to be destroyed.

Societies with a mixed pastoral and agricultural production are, according to Haaland, less sensitive to the carrying capacity of the grazing land. Here the maintenance of this capacity is not an immediate necessity for survival as agriculture provides an alternative basis of subsistence. Population growth may lead to an expansion of agricultural land to the detriment of grazing land. If this process is not accompanied by a corresponding destocking, overgrazing and soil destruction may ultimately lead to a situation where livestock keeping is no longer possible.

Haaland calls attention to a risk which, of course, is always present in this type of society. The problem remains, however,

to specify 1/ under which specific circumstances the process of land degradation will occur, 2/ the existing potential for adaptation or non-adaptation, and 3/ the conditions under which the hazards of soil destruction are, or can be, avoided. There are agro-pastoral societies which have been able to accommodate sustained growth of both human and livestock population over long periods of time, and where the degradation of secondary eco-systems has been more or less controlled. Therefore, more must be known about the particular processes leading to overgrazing and soil destruction in agro-pastoral societies. Here we must content ourselves with just illustrating the complexity of the problem by discussing three cases of agro-pastoral adaptation; a/ the Sukuma and the Wahi Wanyaturu, where the relations between agriculture and pastoralism are mutually reinforcing within the context of the socio-economic system, and b/ the Gogo, where the complementarity between the two production spheres constitute a *sine qua non* for the reproduction of the social system.

4.2. Territorial Expansion

The Sukuma inhabit the area extending inland from the southern and south-eastern shores of Lake Victoria. Most of the country is undulating tableland at an altitude of 1,100 to 1,400 metres above sea level. There are, however, some rocky hills and ridges which at places rise a few hundred metres above the general level of the country. The catena can generally be divided into three parts, viz. the extremely permeable and erodible sandy soils on the hill slopes, the *litopole* hardpan soil in the fringe areas between the hill slopes and the bottom of the valleys and, finally, the heavy impermeable clayey soils in the valleys called *mbupa*. Old settlement areas are more or less devoid of tree cover and consist mainly of open grassland, the so-called cultivation steppe, interspread with strips of bush.²⁴⁾ In most places the main precipitation is expected from November to April, or from December to May. The mean annual rainfall varies from less than 700 mm inland to more than 1 000 mm on the lake shores. The greater part of the area however, is within semi-arid and dry sub-humid zones (Map No. 5).

In the literature, Sukumaland generally refers to the adminis-

trative areas of Mwanza and Shinyanga Regions except Kahama District, totalling some 50,000 square kilometres. Out of a total population of 1.8 million in the entire area, the Sukuma make up 1.3 (Census 1967). However, the type of economy and land use system practised by the Sukuma extends over a much larger tract than the above mentioned. Over the last 50 years the Sukuma have incessantly enlarged their area of occupancy: from about 10,000 square kilometres at the time of World War I to more than 30,000 in the late nineteen fifties (J. C. De Wilde 1967:420). The Sukuma have continued to widen their frontiers and move into districts adjacent to Sukumaland 'proper', mainly to the south and to the west. Thus, from 1948 to 1967 the percentage of Sukuma of the total population rose from 4.9 to 13.6 in Kahama District, from 18.7 to 36.8 in Nzega District, and from a negligible figure to 27.1 in Biharamulu District (Census 1957 and 1967). From 1948 to 1967 the total Sukuma population increased from 888,800 to 1,529,917 (Census 1957 and 1967). Such a sharp increase can not only be accredited to natural growth but also to processes of social inclusion, such as intermarriages with other groups and other people 'turning' Sukuma.

Rights to land are usufructory among the Sukuma. Farming land is allocated by the village leaders. Unallocated land together with cultivated fields after harvest are, however, open to communal grazing. Access to farming land, pasture and water are the three main factors that make up the settlement pattern. With an increased cattle population, the settlement becomes more and more dispersed. Rather than being organized in villages, the Sukuma were, before the recent villagization (1974), organized in neighbourhoods.

The Sukuma society is characterized by high mobility. A particular homestead is rarely maintained more than five to ten years before the family moves and establishes a new homestead. The most frequent kind of movement is a short-distance movement within the neighbourhood, *kufuma kubala*. Because of litter and scraps from the household the place becomes unclean after a number of years. The solution to this problem is to move to some other part of the family holding or the neighbourhood, and rebuild the homestead there.

Another kind of movement is that out of the neighbourhood, *kuhama*. The reason for this kind of movement is generally land degradation or scarcity of arable land and pasture. If a man moves to an inhabited area he has to obtain permission from the local leaders to settle there. If he moves to an uninhabited area he may settle down without formalities, unless it is a reserved area.

The land use system of the Sukuma is extensive. Although the man/animal ratio seems to have been rather stable over the last 40 years, especially in some of the northern parts of Sukumaland, fluctuating around 1:1⁴⁵, the use of manure in agriculture is negligible. Only grass fallow is common, whereas a type of crop rotation has developed in some old settlement areas. The system is characterized rather by a cycle of 'exploit-and-move', the time span of which varies according to local environmental conditions and population pressure. As mentioned above, access to farming land, pasture and water are the crucial factors with respect to the agro-pastoral economy. When an old settlement area becomes too congested, the option to move to less congested, or uninhabited areas is the safety valve of the system. We can talk of a developmental cycle of the neighbourhood which starts with the opening up of new lands in an uninhabited area and ends up with population pressure, over-cultivation, and land degradation followed by out-migration and recovery of soils under regenerating bush. D. W. Malcolm (1953) contends that this is a long-term cycle of 30 to 50 years. He cites, among others, the case of the Nyashimba village:

It has taken about forty-five years, since the first fields were cut out of the bush in Nyashimba village, for the population to multiply and to reduce the soil fertility to a point which has caused all but three villagers to move elsewhere. (D. W. Malcolm 1953:vi)

Sukumaland is today the main cotton producing area in Tanzania. Cotton was introduced during German colonialism, but not until the early fifties did cotton production gain momentum in the area (R. Austen 1968:56, De Wilde 1967:426f.). Most of the cotton was grown by Sukuma smallholders. The adoption of cotton cultivation has had far-reaching effects on the settlement pattern by causing an acceleration of the developmental cycle of

the neighbourhood. The expansion of cotton cultivation partly led to extension of cultivated area, partly, through earnings of cotton invested in livestock, to a higher grazing density. Both processes led to shortage of arable land and pasture as well.

In the new settlement areas, the mutually reinforcing relation between agriculture and pastoralism was further accentuated. Thus in areas suitable for flat cultivation ²⁶¹, the adoption of the ox-plough became fairly common, leading to an increase in agricultural productivity. Further, livestock as the main form of accumulated wealth was of decisive importance both in control of labour and in acquisition of agricultural machinery. M. P. Collinson, comparing an old settlement area with an area of more recent settlement, finds that in the former, 29 per cent of the cropped area was cultivated by means of purchased resources, whereas the figure in the latter case was 72 per cent. In the former case 6.5 per cent of the area cultivated by means of purchased resources was done by capital intensive methods, the rest being done by hired labour; in the latter, virtually all the area was cultivated either by tractors or ox-ploughs, purchased or hired (M. P. Collinson 1972:26).

In Chapters 2 and 3 we drew attention to the type of integration that exists between agriculture and animal husbandry in the agro-pastoral system of the Sukuma, i.e. the contradictions that exist between the two economic activities and how they are mediated by human labour. As long as land is abundant, long term fallow caters for the recovery of soils. With land increasingly becoming scarce, the system is threatened. Still, the Sukuma have succeeded remarkably well in balancing the carrying capacity of land and in keeping, in some cases barely, to the margins. Thus in some old settlement areas of Mwanza Region, densities of human as well as animal population are very high, each approaching 100 per square kilometre in the most congested areas. (Mwanza Integrated Regional Planning Project, 1976, Chapter 11).

With population increase as a constant, agricultural activities as well as animal population will increase because of the interdependence that exists between agriculture and animal hus-

bundry: in other words, the more agriculture the more live-stock, and vice versa. These processes result in turn in a two-fold 'sloughing off': 1/ successful families who have succeeded in producing a surplus from the agricultural sphere, invest in cattle and move, mainly because of lack of pasture, 2/ those who will have to move due to lack of arable land to sustain themselves. Historically, there are two main directions of the migration: one to the south and south-east, the other to the west. To the south and to the south-east, there were areas suitable for pasture. This was also the direction of the migrating cattle owners. To the west, there was tsetse infested *miombo* woodland. Those who moved in this direction had little or no cattle. Nevertheless, they also started to acquire cattle as soon as they had made the habitat suitable for livestock rearing. There are areas in the west, covered by bush and tsetse-infested in the nineteen fifties, which today are open grassland.

The achievements of these processes, within the narrow scope set for this discussion, are a/ sustained productivity in old settlement areas and, b/ increased productivity in new settlement areas.

4.3. Intensification

The Wahi Wanyaturu of the Singida District in Tanzania represent a case of agro-pastoralism with a marked element of intensive agriculture. In 1967 the Turu numbered 246,000 people (Census 1967), as compared to an estimated 107,000 in 1911 (H. Schneider 1970:8). For the period 1948-1967, the annual population increase was, according to the official census reports, 1.6 per cent (Census 1957 and 1967). For the Vahi ²⁷¹ section, which represents about 40 per cent of the Turu (H. Schneider 1970:10) there are, however, no specific figures.

The Vahi live on the Turu Fault block in the Rift Valley at an altitude averaging 1 700 metres. As in the case of Sukumaland the region is semi-arid, most of the rain falling from December to April (Map No. 3 and 4). The landscape is undulating, with few sharp rises other than those along the fault block. Most of the arable area consists of sandy soils. The marshes that dot

the land everywhere are of crucial importance. Since few of these are so deep that they will hold more than a little surface water during the dry season, it is possible to use swamp vegetation for reserve grazing. In addition, the swamps provide a permanent water supply (Schneider 1970:13).

According to Schneider's description, the Vahi live in villages consisting of ten to thirty homesteads surrounded by cultivated fields.

The typical Turu village consists of a hill or a high place on which the village rests Surrounding the village is open grassland into which cultivation can expand and where grazing can be obtained for small stock and other animals during part of the year.
(H. Schneider 1970:16)

In depressions alongside the hills lie marshes and beyond them forests. The Turu have sufficient grazing land in the immediate vicinity of the villages throughout the year:

The animals are grazed on the open land around the village or in the nearby forests until the grass is gone. Then they are turned loose in the marshes, which will normally support them throughout the winter except during occasional periods of severe drought.
(H. Schneider 1970:10)

In the late fifties, at the time of Schneider's field-work, the population density was about 40 persons per square kilometre, a medium density according to Tanzanian standards (D. Conyers 1973). The land use system differs considerably, however, from the Sukuma one. It is reported that some of the Vahi villages have been fixed at the same site for more than 100 years (H. Schneider 1970:14). This may partly be explained by the specific possibilities given by the environment. The presence of nearby dry season grazing land in the marshes for example, has made it possible for the Vahi to avoid over-exploitation and consequent destruction of the carrying capacity of the open grassland and forest pasture. Further, 'a gradual expansion of settlement into formerly unused forest land' (H. Schneider 1970:10) has enabled a fixing of village site. More important is the intensification of agricultural practices developed by the Vahi Wanyaturu: 'the technical feature upon which Turu depend is systematic manuring of the arable land

each year.' (H. Schneider 1970:16).

This means that livestock is of decisive importance in Vahi agriculture. The man/animal ratio in the area, based on aggregate figures, is about 1:1. But the animals are fairly well spread. Almost every household possesses cattle, and those who own few or no animals get access to animals and manure through an intricate system of cattle loans, the *urúha* system (H. Schneider 1968:427, 1970:78).

The need for manure has given rise to special practices of animal husbandry. The animals are penned for a considerably longer period than in most other pastoral and agro-pastoral societies. This facilitates collecting of droppings and manure. The animals are kept in the kraal from sunset until 10 or 11 a.m. the next day. The manure is then carried from the kraal to the fields. It is reported that land which has regularly been manured for several years produces more than virgin land (H. Schneider 1970:71). This makes it more attractive to acquire land in old settlements than to clear new land in the forest.

Compared with labour and manure, land is a less scarce resource. The important factors are the number of working adults in the homestead and the amount of manure available (H. Schneider 1970:71).

Each household produces primarily for the subsistence of its members but also attempts to obtain a surplus of grain which can be exchanged for cattle. As stated above, livestock, or more specifically their manure, is of vital importance for agriculture and so is the labour of women. Cattle provide manure but they are also converted to female labour through marriage transactions by bride price. Increased production in agriculture is mainly achieved through intensification of agricultural practices, i.e. through the deployment of female labour and manure. Therefore, to optimize production, each household must strike a balance with respect to two factors, viz. manure (cattle) and labour (women).

Schneider has aptly summarized the agro-pastoral system of production of the Wahi Wanyaturu:

The fundamental orientation of the economic system is toward maximization of livestock, usually through the conversion of surplus grain to livestock and subsequent promotion of natural increase, with further investment in women and land to increase grain supplied and thus increase wealth in livestock. (H. Schneider 1968:444)

4.4. Complementarity

The Gogo inhabit the driest parts of the great central plateau of Tanzania. The average rainfall of the region is less than 600 mm per annum (P. Rigby 1969:13). (Map No. 3, 4). The precipitation is extremely erratic, with strong variations not only from one year to another, often the rainfall is not more than 400 mm, but also in different areas within the region (P. Rigby 1969:33, J. P. Mofett 1958:155). R. F. Burton, who a century ago traversed the region, gives a vivid picture of the dry season landscape:

The general aspect is a glaring yellow flat, darkened by long growths of acrid, saline, and succulent plants, thorny bush, and stunted trees, and colouring is monotonous in the extreme. It is sprinkled with isolated dwarf cones bristling with rocks and boulders, from whose interstices springs a thin forest of gum, thorns and mimosas. (R. F. Burton 1860:282)

The region is notorious for droughts and 'the frequency of famines provides the Gogo with a highly adequate basis for a historical chronology and accounts for the endemic nature of drought and famine conditions in Gogo economy and ecology.' (P. Rigby 1969:21). Rigby records 18 such periods of drought and famine, which have occurred in Gogoland during the last 100 years. Nowadays, the well-developed relief food programme of the Tanzanian government alleviates the disastrous effects of the recurrent droughts, but in earlier times famines took a heavy toll: it is estimated that 50,000 people died in the famine of 1918/19 (P. Rigby 1969:215.).

In 1948 the Gogo numbered about 270,000 and in 1967 about 360,000 (Census 1957, Census 1967). The overall population density in Dodoma District, where the main part of Gogo live, is less than 20 persons per square kilometre (Census 1967). Although average figures of population density tend to obscure great local variations, they do, however, indicate differences

compared with other agro-pastoral societies such as the Sukuma and the Wahi Kanyaturu, discussed above. The man/animal ratio in Dodoma Region taken as a whole was in 1972 around 1:1.2. 28)

Rigby describes the Gogo economy in the following terms:

The Gogo subsist basically upon the hoe-cultivation of sorghum and bulrush millet crops, but also rely upon their herds of cattle, sheep and goats, to a great extent during famine and drought and to a lesser extent all the time. Most Gogo own, or have rights in, some livestock, and many have very large herds. The predominant values of Gogo society, the economic exchange, ritual and symbolic contexts, are expressed in terms of cattle. (P. Rigby 1967:657)

Because of drought and famine and, to a lesser extent, exhaustion of local resources of cultivable land and pasture the residential mobility of homestead groups is frequent. As the labour required for agricultural production cannot be provided by a single domestic group, co-operation between these mobile groups is necessary and firm ties are established through the exchange of livestock for women (bride price). Cattle transactions are not only crucial for the establishment of affinal ties, they are also of central importance in the whole complex of kinship relations (P. Rigby 1969:500).

Moreover, according to Rigby,

even from a subsistence point of view, livestock are important, particularly at the 'crisis points' of the economic cycle ... during the periodic (usually localized) famines, livestock plays a central subsistence role (a) in being exchanged for crops obtained from more fortunate areas and (b) in being the means by which new relationships are created, or existing ones 'activated', in the new neighbourhoods to which homestead groups move. (P. Rigby 1969:501)

Agriculture provides the basis of subsistence, but cattle are of great social and economic importance. Like the Turu, the Gogo use dung from the cattle byre to manure those fields which are closest to the homestead, and in addition, dung is utilized by grazing cattle over the stalks in the fields after the harvest (P. Rigby 1969:527, 53f.). In this respect, we may speak of a 'positive' interrelation between agriculture and animal husbandry, but otherwise we do not find the same kind of agro-pastoral dynamics as we do in the case of the Sukuma and the

Turu. The economic role of animal husbandry is rather complementary to agriculture: it is an insurance for agricultural failure. Livestock is intermittently exchanged for grain in normal years and functions as 'an insurance against famine in bad years, enabling Gogo to have the strength to carry out cultivation for the following season.' (P. Rigby 1969:43). In other words, agriculture is the basis of subsistence, but the technological and climatic constraints on cultivation make cattle an essential element in the long term viability of the Gogo economy. But the Gogo are not simply cultivators who happen to keep cattle. Cattle are of vital importance for the integration and reproduction of the social system, and on this level, that is 'on the level of kinship relations and ideology Gogo society may easily be said to be a pastoral one.' (P. Rigby 1969:26). In spite of this 'pastoral inclination' in Rigby's terms, the Gogo

do not even pretend that they could subsist entirely upon the products of their cattle and small stock, though there is some evidence that the higher the number of cattle per person in any part of Ugogo, the lower the corresponding average acreage planted.
(P. Rigby 1969:44)

The Gogo economy rests upon a limited integration of two separate subsistence activities, each of which is limited and precarious in itself but, combined with the other one, makes a vital contribution to subsistence.

4.5. Conclusion

We have in this chapter emphasized the dynamic role of animal husbandry in agro-pastoral societies. Apart from its apparent economic use, the satisfying of immediate consumption needs, livestock also play an important part in transactions to obtain agricultural labour and in the process of maintaining the social system. The strategy is, basically, to establish a dynamic relation between the agricultural and the pastoral sectors in order to optimize production and channel the output along a range of socially determined lines. Haaland (1977) has called attention to the problem pertaining to this type of economy in a situation of increasing pressure on the ecological niche; in a situation of increasing human and livestock populations over-

grazing and soil deterioration will finally lead to a situation where a viable animal husbandry is no longer possible. However, systematic knowledge of many crucial aspects of this process is still lacking. In many cases agro-pastoral systems have shown a considerable capacity to cope with the problems that go with the increasing pressure on the ecological niche.

This problem is, of course, of great complexity. Not only must the internal structure of the particular society be taken into account. The natural habitat, historical conditions and colonial and national policies must also be considered. This taken for granted, we have here confined ourselves to discuss local responses to the problem in order to illustrate some alternative strategies of adaptation.

In the Sukuma case availability of unoccupied areas made territorial expansion a security valve. The Wahi Wanyaturu developed a tendency to intensification; the reliance on manure for sustained agricultural productivity. In the Gogo case each one of the two activities, agriculture and animal husbandry, was limited and precarious in itself, but combined with the other, made a vital contribution to subsistence. Here we find a tendency of complementarity and of balanced relations between the two spheres of production; the more cattle the less agriculture (Rigby 1969:44).

Stating this, however, is not to say that the risks to which Haaland refers are negligible. Even within the regions we have discussed above, there are areas in incipient ecological imbalance or in an already critical stage ²⁹⁾ (Map No. 4). As one characteristic of agro-pastoralism is that surplus from agriculture to a large extent is invested in livestock, agricultural expansion is likely to result in an increase of the number of livestock. In Sukumaland, for example, where the expansion of the cash crop sector has been dramatical during the last decades, the livestock density has in many areas reached a critical point. Without proper long term planning land resources in the most affected areas are likely to deteriorate beyond a point where a natural recovery is possible.

However, it is impossible to cope successfully with problems

of development planning such as, for example, overstocking without an integrated approach based on a thorough understanding not only of the system of production, but also of the utilization of livestock as tokens in all essential social nexuses; social ties are expressed in the idiom of livestock exchange. Livestock is thus of utmost importance not only for subsistence, but also for the reproduction of the social system.

In the Sukuma case, for example, agricultural expansion must not be seen in isolation from the livestock sector, as cattle, apart from its economic role, play a vital part in most social relations, particularly for group formation and recruitment of labour. In the Wahi Wanyaturu economy animal husbandry is a precondition for the maintenance of the fertility of land under intensive cultivation. On the social level cattle play the same important part as in the former case. Among the Gogo, finally, livestock keeping is an important insurance against agricultural failure in the absence of modern dry farming technology and, at the same time, cattle are of vital importance for the integration and reproduction of the social system.

5. CONCLUDING REMARKS

The intensive study of pastoral societies during the last decades has contributed considerably to an increased understanding of pastoral systems of production. Since pastoralism has attracted interest from many disciplines and since its empirical field is clearly delimited, this has encouraged the interdisciplinary dialogue, which has greatly stimulated the theoretical debate on the subject. Characteristics such as reliance on one dominant sphere of production, animal husbandry, relatively similar natural habitat, arid and semi-arid areas, simple technology, and extensive utilization of natural pasture, have granted the field of pastoralism a certain specificity. Agro-pastoralism, on the other hand, does not immediately appear as a clearly delimited empirical field, and this may be one reason why there are so few attempts at approaching agro-

pastoralism as a particular field of investigation. In this report we have indicated what we regard as some specificities of agro-pastoral systems of production.

On one level, that is in the analysis of the social system, there are no grounds for making an analytical distinction between pastoralism and agro-pastoralism. Here we would rather argue that differences in social forms should be viewed as variations on a common theme. Though there may be shifts in emphasis in the importance of livestock in the social system, the role of livestock is still always crucial. The circulation of livestock is instrumental to the reproduction of domestic units and that of the local society as a whole. Thus, exchange of animals serves to establish and maintain social relations, for example, at marriages, and in creating and reviving a number of extra-familial alliances.

However, important differences appear on the level of material production since agriculture constitutes the economic base in one case and animal husbandry in the other. This has different consequences not only for the organization of production, but also for the inner dynamics of production units, and for the potential for adaptation and development of the two types of society. Pastoral societies must not be studied in isolation from the sedentary agricultural contexts essential to their viability. There is, as has been indicated, always a certain degree of 'symbiosis' between pastoral and agricultural societies; but in the case of agro-pastoral societies the 'symbiosis' exists, so to speak, within one and the same societal context. This makes it all the more important to establish the specific interdependencies that exist between the two productive activities. Such research is not only a matter of academic interest. It also has bearings on the question of social change and development planning. The response of the local society to a changing situation - for example, the penetration of the market, the expansion of cash cropping and the appearance of wage labour - or to development efforts - such as projects for up-grading of stock, enclosure of grazing areas, ley farming and destocking - is to a large extent determined by the specificities of the internal structure and inner dynamics of the local society.

This report has dealt with only a few aspects of agro-pastoral production, the intention being mainly to delimit a field of investigation and raise some questions for further research. A sharpening focus on the relations between agriculture and pastoral production, and a systematic approach to how constraints on this level are related to social and political forms, and to culture, should contribute not only to a deeper understanding of agro-pastoralism, but also raise questions relevant to the study of pastoral production in Africa.

6. MAP SUPPLEMENT

Map 1 ADMINISTRATIVE BOUNDARIES
AND POPULATION

----- provincial (Kenya) and regional (Tanzania) boundaries

••••• 10 000 people

(After A. Hjort
in Lundgren (ed.) 1975)

Map 2 CATTLE POPULATION

Map 3 RAINFALL PROBABILITY

Amounts of rainfall likely
to be exceeded in four
years out of five

(After Morgan 1969)

Map 4 AREAS OF DENSER CULTIVATION, AREAS WITH
REPORTED SOIL EROSION AND ETHNIC GROUPS
(with Wahi sub-area)

(After Lundgren 1975, Morgan 1969,
Schneider 1976)

7. FOOTNOTES

1. A typical example of this is the 'cultivation steppe' of Tanzania. See Rounce (1949).
2. In applying the concept man/animal ratio we use, throughout this text, 'animal' as synonymous with livestock unit: 1 livestock unit equal to 1 head of cattle or 5 sheep and/or goats.
3. This project is initially financed by SAREC, Stockholm.
4. Cf. Pastoralism in Africa (1975), Dahl & Hjort (1976), Land Use and Development (1977), and Konczacki (1978); see also Special issue of Anthropological Quarterly (No.3, 1971), Perspectives on Nomadism (1972) and Bonte et al (1973-75).
5. Cf. Production pastorale et société, Bulletin de l'équipe écologie et anthropologie des sociétés pastorales, Paris (1977-), Newsletter of the Commission on Nomadic Peoples, International Union of Anthropological and Ethnological Sciences, Montreal (1978-) and Pastoral Network Paper, ODI, London (1976-).
6. Some examples of different anthropological usages of the term 'pastoralism' are found in Barth (1964:4), Goldschmidt (1979), Jacobs (1965:146), Krader (1958:499), Kroeber (1948:277), Sahlin (1968:33), Salzman (1972:60-2), Spooner (1971:199), Stenning (1958:99).
7. For a critique of this approach see Salzman (1971) and Haaland (1977:189).
8. Cf. Goldschmidt (1965) and Schneider (1974).
9. In anthropological literature there are numerous references to the mixed diet of pastoralists; for example see Gulliver (1955:6 and 1962:433), Haberland (1963:98ff.), Lewis (1961:32), Monod (1975:134), Spencer (1965:2 and 1973:81).
10. Cf. Monod's discussion (1975:134ff.) on this topic; at the University of Stockholm Dahl & Hjort are presently engaged in a study of exchange between pastoralists and agriculturalists.
11. This theme is thoroughly discussed in Dahl & Hjort (1976). Already in 1965 Deshler paid attention to this aspect in his article 'Native Cattle Keeping in East Africa'.
12. Cf. Dyson-Hudson (1966:50, 85f., 92), Goldschmidt (1976: 127-36), Gulliver (1955. Chapter 7), Spencer (1965:27f., and 1973:72, 78).
13. Spencer (1965:7f.) uses the terms 'subsistence herd' and 'surplus herd'. For a critique of these terms see Dahl & Hjort (1976:135). For further details see Dyson-Hudson (1966:32-4), Gulliver (1955:18ff., 40), Lewis (1961:32ff.), Spencer (1965:7f., 292f. and 1973:20-6).

14. This question is thoroughly discussed in Dahl & Hjort (1976, Chapter 10).
15. Cf. Dyson-Hudson (1966:53-8), Goldschmidt (1976:136ff.), Spencer (1965:53-8, and 1973:76f.; 139f.).
16. 'Karimojong conceive of the ideal form of settlement as housing a single extended family: an elderly man with several wives; their adult sons and wives, and the children of these; /.../. In this sense, the settlement is a single homestead, has a single corral, and is known by the name of the family head.

The ideal is not frequently observed, because it corresponds to a specific stage of family development, requires considerable cattle wealth, and implies good equilibrium between the labour capacities of the family and the subsistence capacities of the herd' (N. Dyson-Hudson 1966: 105). For further reading see Gulliver (1955 and 1969).

17. Cf. the case of the Nuer where 'the network of kinship ties which links members of local communities is brought about by the operation of exogamous rules, often stated in terms of cattle. The union of marriage is brought about by payment of cattle and every phase of the ritual is marked by their transfer or slaughter. The legal status of the partners and of their children is defined by cattle-rights and obligations' (E. E. Evans-Pritchard 1940:17). See also Dyson-Hudson (1966:92, et passim) and Gulliver (1969).
18. Concerning exchange of livestock and agricultural products see page 12; concerning trade relations see Asad (1970: 30-34), Dyson-Hudson (1966:7, 86f.), Evans-Pritchard (1940: 87f), Gulliver (1955:211), Lewis (1961:91, 268 and 1962), Spencer (1973:25f., 119, 216).
19. Agro-pastoralism should not be confused with 'agriculture proper'. Agro-pastoral practices raise problems that are different from those of purely agricultural societies. In the former case, the strong emphasis on animal husbandry as well as agriculture results in a high pressure on land, and land is used for the combined production of grain, cash crop (in many areas) and livestock. 'Agriculturalists proper' may keep livestock but this does not play a preponderant part in the economy. Cattle are not conspicuously involved in the socio-economic system and the herds do not compete for land to a degree where devastation of land becomes an apparent risk.
20. Compare for example Abrahams' information on the Sukuma and the Nyamwezi with Schneider's on the Turu. Says Abrahams: 'In Usukuma over 50% of the household heads apparently own cattle, and in the better stocked areas of Unyamwezi proper the proportion is roughly 50%' (Abrahams 1967:34). Says Schneider: 'almost all Turu homesteads have livestock, the exceptions being so insignificant as to require no attention' (Schneider 1970:28).

21. Cf. footnote 9.
22. Except when otherwise noted, all references to the Sukuma are based on the field work of P. Brandström.
23. In this cattle zone Mwanza, Shinyanga and Tabora Regions have been included. Estimate based on Agricultural Census 1971-72 (from T.F.N.C. 1978).
24. For an extensive treatment of the 'cultivation steppe' see Rounce 1949.
25. Man/Animal Ratio in Mwanza District^x, 1954, 1947, 1957 and 1974

1954	1947	1957	1974
1:1	1:1.2	1:1	1:0.9

^x
Mwanza including Geita District; district boundaries as before 1974

(The figures above are estimates based on Malcolm (1953), District Records, Mwanza Integrated Regional Planning Project (1976), Census 1957 and Egerö & Henin (1972).)

26. Large areas of Sukumaland are not suitable for flat cultivation. Here land is cultivated on ridges. Most ridge cultivation is carried out by hand, while ploughing is the common technique for flat cultivation
27. Vahi refers to the people whereas Wahi refers to the country (Schneider 1970:10).
28. Based on Agricultural Census 1971-72 (from T.F.N.C. 1978) and Egerö & Henin (1972).
29. The problem of land deterioration, soil erosion and subsequent decreasing productivity of land in many areas within these regions, have since long been a matter of great concern to the Tanzanian Government.

8. BIBLIOGRAPHY

- Abrahams, R.G. : The Peoples of Greater Unyamwezi, Tanzania
1967 (Nyamwezi, Sukuma, Sumbwa, Kimbu, Konongo).
Ethnographic Survey of Africa, East Central
Africa, Part XVII.
London, International African Institute.
- Anthropological Quarterly 1971, Special Issue, Vol.44, No 3.
- Asad, T. : The Kababish Arabs. Power, Authority and Consent
1970 in a Nomadic Tribe.
London, C. Hurst & Company.
- Austen, R.A. : Northwestern Tanzania under German and British
1968 Rule, Colonial Policy and Tribal Politics,
1889-1939.
New Haven.
- Barth, F. : Nomads of South Persia: The Basseri Tribe of the
1964 Khamseh Confederacy.
Oslo, Universitetsforlaget.
- Bonte, P. et al. : Etudes sur les sociétés de pasteurs nomades,
1973-77 Vol. 1-4.
Paris, Cahier du C.E.R.M.
- Bonte, P. : 'Apropos de la "circulation" des femmes', in
1976 M. Godelier & P. Bonte : Le problème des formes
et des fondaments de la domination masculine -
deux exemples: les Baruya de Nouvelle Guinée -
les Bahima d'Ankole.
Cahier du C.E.R.M., No 128.
- Brandström, P. : Livestock Development in Mwanza Region, in
1976 Mwanza Integrated Regional Planning Project,
Project Report: Vol. 3.
Stockholm, Liber Snabbtryck.
- Brinck, P. : 'Preface', in A. Rapp, H.N. Le Houérou & B. Lund-
1976 holm (eds.), Can Desert Encroachment be Stopped?
Ecological Bulletin No. 24
Stockholm, Liber Tryck.
- Burton, R.F. : The Lake Regions of Central Africa. 2 Vols.
1860 London.
- (Census 1957) African Census Report 1957.
1963 Bureau of Statistics, Dar es Salaam.
- (Census 1967) 1967 Population Census.
1969-71 Vol. 1, Statistics for Enumeration Areas (1969).
Vol. 3, Demographic Statistics (1971).
Bureau of Statistics, Dar es Salaam.

- Collinson, M.P. :The Economic Characteristics of the Sukuma Farming System.
1972 Economic Research Bureau Paper 1972:5,
University of Dar es Salaam.
- Conant, F.P. :'Korok: A Variable Unit of Physical and Social Space among the Pokot of East Africa'.
1965 American Anthropologist, 67, 1965.
- Conyers, D. :Agro-Economic Zones of Tanzania.
1973 BRALUP Research Paper No. 25, University of
Dar es Salaam.
- Copans, J. (ed.) :Sécheresses et Famines du Sahel, Vol. 1-2.
1975 Paris, Maspero.
- Dahl, G. & Hjort, A. :Having Herds; Pastoral Herd Growth and Household Economy.
1976 Stockholm, Liber Tryck.
- Deshler, W.W. :'Native Cattle-Keeping in Eastern Africa',
1965 in Leeds & Vayda (eds.), Man, Culture and Animals.
Washington, American Association for the
Advancement of Science.
- de Wilde, J.C. et al. :Experiences with Agricultural Development in Tropical Africa, Vol. II,
1967 The Case Studies.
Baltimore, The Johns Hopkins Press
- Dyson-Hudson, N. :Karimojong Politics.
1966 Oxford, Oxford University Press.
- Edgerton, R.B. :The Individual in Cultural Adaptation; A Study of four East African Peoples.
1971 Berkely, University of California Press.
- Egerö, B. & Menin, R. :The 1967 Population Census of Tanzania, A Demographic Analysis.
1972 BRALUP Research Paper No. 19,
University of Dar es Salaam.
- Flam, Y. :The Social and Sexual Roles of Hima Women: A Study of Nomadic Cattle Breeders in Nyabushozi County,
1973 Ankole, Uganda.
Manchester, Manchester University Press.
- Evans-Pritchard, E.E. :The Nuer. A Description of the Modes of Livelihood and Political Institutions of a Nilotic People.
1950 (1940) Oxford, Clarendon Press.
- Goldschmidt, W. :'Theory and Strategy in the Study of Cultural Adaptability'.
1965 American Anthropologist, 67, 1965.

- Goldschmidt, W. :The Culture and Behavior of the Sebei. A Study in Continuity and Adaptation.
1976 Berkely, Los Angeles, London, University of California Press.
- Goldschmidt, W. :'A General Model for Pastoral Social Systems',
1979 in Equipe Ecologie et Anthropologie des Sociétés Pastorales (eds.), Pastoral Production and Society.
Cambridge, Cambridge University Press and Editions de la Maison des Sciences de l'Homme.
- Gulliver, Ph. :The Family Herds. A Study of two Pastoral Tribes in East Africa: The Jie and the Turkana.
1955 London, Routledge & Kegan Paul.
- Gulliver, Ph. :'The Evolution of Arusha Trade',
1962 in P. Bohannan & G. Dalton (eds.), Markets in Africa.
Northwestern University Press.
- Gulliver, Ph. :'Nomadism among the Pastoral Turkana of Kenya: Its Natural and Social Environment',
1969 in P. Rigby (ed.), Society and Social Change in Eastern Africa. Nkanga 4.
Kampala, Makerere Institute of Social Research.
- Haaland, G. :'Pastoral Systems of Production: the Socio-Cultural Context and Some Economic and Ecological Implications',
1977 in P. O'Keefe & B. Wisner (eds.), Land Use and Development. African Environment Special Report 5.
London, Published by the International African Institute in association with the Environmental Training Programme, UNDP-IDEP-SIDA.
- Haberland, E. :Galla Süd-Äthiopiens. Völker Süd-Äthiopiens. Ergebnisse der Probenius-Expeditionen 1950-52 und 1954-56. Band II.
1965 Stuttgart, Verlag W. Kohlhammer.
- Irons, W. & Dyson-Hudson, N. (eds.) :Perspectives on Nomadism.
1972 Leiden, E.J. Brill.
- Jacobs, A.H. :'African Pastoralists: Some general Remarks'.
1965 Anthropological Quarterly, Vol. 38, 1965.
- Konczacki, Z.A. :The Economics of Pastoralism. A Case Study of Sub-Saharan Africa.
1978 London, Frank Cass.
- Krader, L. :'Ecology of Nomadic Pastoralism'.
1959 International Social Science Journal, Vol. 11.

- Kroeber, A.L. : Anthropology. New Ed. Rev.
1948 New York, Harcourt, Brace & Co.
- Land Use and Development. African Environment Special Report 5.
1977 P. O'Keefe & B. Wisner (eds.).
London, Published by the International
African Institute in association with
the Environmental Training Programme,
UNDP-IDEP-SIDA.
- Le Houérou, H.N. Rapp, A. : 'Can desertification be stopped?
1976 Summary and Recommendation',
in A. Rapp, H.N. Le Houérou &
B. Lundholm (eds.) Can Desert
Encroachment be Stopped?
Ecological Bulletins No. 24.
Stockholm, Liber Tryck.
- Lewis, I.M. : A Pastoral Democracy: A Study of Pastoralism and
1961 Politics among the Northern Somali of the Horn of
of Africa.
London, Oxford University Press.
- Lewis, I.M. : 'Trade and Markets in Northern Somaliland',
1962 in P. Bohannan & G. Dalton (eds.), Markets in
Africa.
Northwestern University Press.
- Lundgren, B. (ed.) : Land Use in Kenya and Tanzania: The
1975 Physical Background and Present Situation and an
Analysis of the Needs for its Rational Planning.
Stockholm, Royal College of Forestry,
International Development Division.
- Malcolm, D.W. : Sukumaland, a People and Their Country. A Study
1953 of Land Use in Tanganyika.
London, International African Institute, Oxford
University Press.
- Mazingira, 2. The World Forum for Environment and Development.
1977 Oxford, Pergamon Press.
- Meillassoux, C. : 'Development and Exploitation: Is the Sahel
1974 Famine Good Business?'
Review of African Political Economy,
No. 1, 1974.
- Meyn, K. : Beef Production in East Africa (with comprehensive
1970 bibliography on cattle breeding in East Africa).
München, Welt-Forum Verlag.
- Mofett, J.P. : Handbook of Tanganyika. (Second edition).
1958 Dar es Salaam, Government Printer.

- Monod, T. (ed.) : Pastoralism in Tropical Africa. Studies presented and discussed at the XIIIth International African Seminar, Niamey, December 1972.
1975 London, Ibadan, Nairobi. Published for the International African Institute by Oxford University Press.
- Morgan, W.T.W. (ed.) : East Africa: Its Peoples and Resources.
1969 Nairobi, London, New York, Oxford University Press.
- Mwanza Integrated Regional Planning Project, Vol. I-V.
1976 Stockholm, Liber Snabbtryck.
- Newsletter of the Commission on Nomadic Peoples, International Union of Anthropological and Ethnological Sciences. Montreal.
1978-
- Nicolaisen, J. : Ecology and Culture of the Pastoral Tuareg.
1963 Nationalmuseets Skrifter. Etnografisk Række, IX. København.
- Oberg, K. : 'The Kingdom of Ankole in Uganda'.
1970 (1940) in M. Fortes & E.E. Evans-Pritchard (eds.)
African Political Systems.
London, Oxford University Press.
- Pastoral Network Paper. ODI (Overseas Development Institute).
1976- London.
- Pastoralism in Tropical Africa, Studies presented and discussed at the XIIIth International African Seminar, Niamey, December 1972. (ed. by) T. Monod.
1975 Published for the International African Institute by Oxford University Press.
- Perspectives on Nomadism. (eds) W. Irons & N. Dyson-Hudson.
1972 Leiden, E.J.Brill.
- Porter, Ph.W. : 'Environmental Potentials and Economic Opportunities - A Background for Cultural Adaptation'.
1965 American Anthropologist, Vol. 67, 1965.
- Production Pastorale et Société; Bulletin de l'équipe écologie et anthropologie des sociétés pastorales.
1977- Paris. Supplément à MSH-Informations.
- Rapp, A. & Le Houérou, H.N. : 'Can Desertification be Stopped?'
1976 in A. Rapp, H.N. Le Houérou & B. Lundholm (eds.)
Can Desert Encroachment be Stopped?
Ecological Bulletins No. 24.
Stockholm, Liber Tryck.

- Rigby, P. : 'Time and Structure in Gogo Kinship'.
1967 Cahier D'Etudes Africaines, No. 28, Vol. 7, 1967,
4e Cahier.
Paris.
- Rigby, P. : Cattle and Kinship among the Gogo: A Semi-Pastoral
1969 Society of Central Tanzania.
Ithaca, London, Cornell University Press.
- Rotenhan, V.D. Freiherr von : Bodennutzung und Viehhaltung
1966 in Sukumaland.
Berlin.
- Rounce, N.V. : The Agriculture of the Cultivation Steppe of the
1949 Lake, Western and Central Provinces.
Cape Town.
- Sahlins, M.D. : Tribesmen.
1968 Englewood Cliffs, New Jersey, Prentice Hall, Inc.
- Salzman, Ph.C. : 'Movement and Resource Extraction Among Pastoral
1971 Nomads: The Case of the Shah Nawazi Baluch.'
Anthropological Quarterly, Special Issue,
Vol. 44, No. 3, 1971.
- Salzman, Ph.C. : 'Multi-Resource Nomadism in Iranian Baluchistan',
1972 in W. Irons & N. Dyson-Hudson (eds.),
Perspectives on Nomadism.
Leiden, E.J. Brill.
- Schapera, I. : A Handbook of Tswana Law and Custom.
1938, (1970) London, Frank Cass.
- Schneider, K.H. : 'Economics in East African Aboriginal Socie-
1964, (1968) ties', in LeClair Jr. & H.K. Schneider (eds.)
Economic Anthropology: Readings in Theory and
Analysis.
New York, Holt, Rinehart and Winston Inc.
- Schneider, K.H. : The Wahi Wanyaturu: Economics in an African
1970 Society. Viking Fund Publications in Anthro-
pology, No. 48.
New York, Wenner-Gren Foundation for Anthro-
pological Research, Inc.
- Schneider, K.H. : 'Economic Development and Economic Change:
1974 The Case of East African Cattle.'
Current Anthropology, Vol. 15, No. 3, 1974.
- Spencer, P. : The Samburu: A Study of Gerontocracy in a Nomadic
1965 Tribe.
London, Routledge & Kegan Paul.

- Spencer, P. : Nomads in Alliance: Symbiosis and Growth among the Rendille and Samburu of Kenya.
1973 Oxford, Oxford University Press.
- Spooner, B. : 'Towards a Generative Model of Nomadism.'
1971 Anthropological Quarterly, Special Issue, Vol. 44,
No. 3, 1971.
- Stenning, D. : 'Household Viability among the Pastoral Fulani',
1958 in J. Goody (ed.), The Developmental Cycle in Domestic Groups.
Cambridge, Cambridge University Press.
- T.F.N.C. (Tanzania Food and Nutrition Centre). Data Report on
1978 the Food and Nutrition Situation in Tanzania
1972/73 - 1976/77.
Dar es Salaam, Department of Planning, T.F.N.C.
- Widstrand, C.G. : 'Pastoral Peoples and Rural Development: A
1973 Case Study.'
Annales, Academiae Regiae Scientiarum Upsa-
liensis.
Kungl. Vetenskapssamhällets i Uppsala Årsbok
17.
Stockholm, Almqvist & Wiksell.