

A Review of African Pastoral Production Systems: Approaches to Their Understanding and Development

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INTRODUCTION

Pastoralism is a system that has been in existence for a long time. Scholars have come up with a cornucopia of definitions related to what entails this centuries old art. Many of these scholars agree, though, that pastoralism could be described as a production as well as a socio-cultural system consisting of an interaction between herders, animals and a given mode of resource management (see, for example, Salih, 1990; Swift, 1977; Widstrand, 1975). From this definition it may be said, therefore, that a pastoralist is any person whose means of livelihood principally is tending grazing animals.¹

Pastoralism sets a unique relationship between people, livestock and land. The strong ties existing among the three make pastoralism different from other forms of livestock production. As the main components of land – grass, shrubs, water, etc. – vary both in time and space, mobility is an important aspect of pastoral production (Swift, 1977). The seasonal variation of resources necessitates relatively large land areas in which some parts may be set aside for use during seasons of optimality. Mobility does take place too to take advantage of other situations, such as exploitation of some specific resources (e.g., available water or salts) or because of increased incidences of disease. Pastoralists thus adapt nomadically to their environment when their adaptation requires movement beyond their home base or when alternatively there is a greater advantage in maximising mobility (Spooner, 1973).

There is no reason to believe that pastoralists currently derive their livelihood entirely from livestock, as was the case many years ago. What is being implied here is that 'pure' pastoralism as we used to know it no longer exists. The evidence available suggests that pastoralists derive a considerable proportion of their subsistence from other sources besides animals. These activities which hitherto never featured among pastoralists include crop production, odd jobs, mi-

gration to towns in search of salaried employment, and even small businesses.

The Concept of Pastoral Development

Much has been discussed about development of pastoral peoples. But what is this 'development?' Pastoral development, like other areas of development, refers to different things and practices in different social, economic and political contexts. There is also the confusion between pastoral development policies and livestock development policies. Although the two may overlap in a range (or pastoral) setting, they have different connotations. Before their differences are discussed, let us see what is actually considered as development.

Todaro (1983) has given two definitions of development. One, "development is a multi-dimensional process of economic and non-economic changes whereby a social system moves away from unsatisfactory conditions towards conditions widely perceived as better;" Two, "development is the entire gamut of changes by which any social systems, remaining responsive to the wishes and welfare of its individuals and subsistence, moves away from a condition of life widely perceived as unsatisfactory towards an alternative condition held to be humanly better." Sandford (1983), on his part, refers to development as being the conscious pursuit of certain objectives with a view to increasing welfare, and it involves technical, economic, social, political and institutional transformations.

Pastoral development is largely a social development activity aiming at the improvement of the standards of living of pastoralists through the provision of health, education, veterinary, water and other services together with building of institutions for management of range systems (Salih, 1991). Good development policies will endeavour not only to provide better material standards of living for pastoral societies and to ensure that pastoral areas supply some of the commodities needed by the nation as a whole, but

also to conserve desirable traditional social features or to replace them with an adequate substitute. That is to say, development should also include the deliberate conservation of what is valuable in the present and that which might be of value to posterity. Livestock development, on the other hand, refers to improvements in the quality and quantity of livestock and their by-products through improved husbandry and marketing, which are normally brought about by improved natural resources (land or pastures), better infrastructure (water, roads, dips, etc.), and superior technology, skills and education.

In this paper, some of the important socio-economic aspects related to African pastoralism and how they can be used to enhance development in pastoral areas are discussed, reflecting the traditional understanding and the present currents.

PASTORAL ECONOMY: HOW CONSISTENT IS IT WITH CONTEMPORARY ECONOMICS?

Pastoral Subsystems

Depending on various characteristics of production we can categorise pastoralism as nomadic, semi-nomadic or transhumant. Nomadic pastoralism, also called nomadism or pastoral nomadism, implies both subsistence herding and wide spatial mobility, often in cyclic movements (Widstrand, 1975). This form of migratory pastoralism is characterised by non-cultivation. Livestock are grazed both for food and for exchange. People are involved in seasonal movements with broadly defined territory. They are particularly characterised by high mobility. Examples of these communities are the Rendille and, to some extent, the Maasai of Kenya. It is, however, important to note that the number of real pastoral nomads – people totally dependent on livestock for their livelihood and wandering in annual cycles over large territories in search of grazing and water is on the decline.

Semi-nomadic pastoralism, also referred to as agro-pastoralism, involves unspecialised herd farming. People move back and forth from arable agriculture to herding or deliberately mix the two. An example of such people is the Turkana community of Kenya.

Transhumance is the most common form of pastoralism nowadays. Transhumant semi-nomads move perhaps once or twice a year, usually in the dry season, from a base camp to a place where water and grazing are available. Many groups are not even full-time pastoralists, but supplement their pastoral economy with some kind of agriculture or trade. The term 'transhumance' is originally used to describe central European and Scandinavian movements of livestock, by peasants, between lowland pastures and summer pastures in the mountains. It is now also used to describe short, seasonal movements of animals, under the care of herders, between permanent homesteads and permanent outlying summer pastures (Widstrand, 1975).

It should be pointed out that 'pure' pastoralism excludes two modes of production – small numbers of animals kept on farming agricultural lands and those herds that form part or all of artificial, specially organised, commercial enterprises (ranches). As already indicated, what makes pastoralism a particularly unique system of production is that, as a way of life, pastoralists are in continuous movement from one ecological niche to another. However, the expansion of the market economy and the emergency of new consumption patterns among pastoralists reveal that pastoral societies are more and more interlocked into regional and national trade.

The pastoral production system has various economic features that must be understood when discussing the pastoral economies, and which must be incorporated in any pastoral development frameworks, if some reasonable degree of success is to be expected. These characteristics are discussed below.

Herd Mobility: Making Land a Variable rather than a Fixed Resource?

The principal resort to pastoralists for dealing with inherently variable vegetation resources has been mobility. This is moving stock from pasture to pasture in accordance with season. Pastoralists recognise areas that offer sustenance during different seasons and move their herds according to the availability of water and pasture. During the rains the herds disperse over the rangelands while in the dry season, and in periods of drought, they concentrate in localities which con-

tinue to afford grazing and water resources (Campbell, 1981).

The extent of mobility required varies inversely with the quality of the resource base. The poorer the resource base and the greater the dependence on pasture, the more mobility is necessary. Even in ranches in the US and in Europe, which adopt a more conventional form of economics, mainly involving income (or profit) maximisation, cattle are moved within the same farm boundary, from low lying, marshy pasture in the summer, to higher, better drained pasture in winter (Crotty, 1980). The principle is the same, but in practice the cattle of the traditional pastoralist occupying less productive rangelands will be of necessity more mobile.

Two forms of mobility are recognised. These are resource exploitation mobility and escape mobility. Resource exploitation mobility is undertaken in response to unpredictable forage and water availability whereas escape mobility involves long distance migration to escape drought. The former enables a dispersed utilisation of forage by pastoral herds at times when forage resources possess the highest level of nutrition. This form of mobility results in annual migratory cycles determined by seasonal changes.

We have seen that pastoralists, especially nomads, reduce livestock losses by utilising mobility. The number of movements undertaken during any year depends on environmental conditions, the state of available resources, and the livestock types owned (Swift, 1977). Many pastoral communities conduct what is known as epicyclical movements. Epicyclical movements, in contrast to transhumance, follow no well-defined annual or seasonal patterns. Instead, they are movements based on few fixed parameters. Such movements allow for a high degree of fluidity and variation in the nomadic system. This provides an opportunity for individual livestock keepers to respond in an independent way to yearly and seasonal environmental changes. Development efforts that have attempted to alter these patterns through settlements, in the past, have by and large failed (Alemu et al., 1999).

Herding a Variety of Animals: Optimising Production through the Principle of Common-Use?

Pastoral production in Africa involves the

rearing of cattle, sheep, goats and camels. The donkey is also kept in many pastoral societies as a beast of burden. Cattle are kept mainly for milk and occasionally for meat. The camels play a similar role. These animals are sold when there is a major cash requirement. Sheep and goats provide meat and milk for subsistence as well as petty cash for the household. The pastoral system is actually thought to be subsistence oriented even though this thinking has of late faced a lot of criticism. This is because, whilst this argument could have been valid in the past, it can now only be true in isolated (or closed) economies; where there is no infiltration of 'modern' economic influences; a rare phenomenon indeed nowadays.

Herding a variety of animals by pastoralists is also a forage and livestock management strategy and can be viewed as having economic rationality. Herd diversification is used as a means of herd or production maximisation. Several types of animals are maintained to secure survival of the pastoralists. Therefore, the rearing of a number of livestock species has ecological and economic implications. Each species grazes different ecological niches and has different economic and social value (Campbell, 1981). Each kind of stock prefers to graze certain plant species and at certain levels of elevation. Also different species have different water requirements. Another facet to the importance of herd diversity is that some species have high fecundity and resistance to various adverse conditions.

Livestock economists refer to grazing a common range or pasture unit by more than one kind of animal, either at the same time or at different times within the year, as common- or dual-use (Workman, 1986). Pastoralists adopt this principle of common-use; or, in economic parlance, at least sub-consciously, they try to attain an optimum combination of outputs. As already noted, since different animal species have different feeding habits and dietary preferences, and this is well known by the pastoralists themselves, the most efficient range use can be attained by common-use. As in many land-use decisions for which the alternative products have a price (and this need not be monetary as in the 'modern' world, because it may be physical or even non-material), for example, livestock and forage, principles of production economics can be used to explain

pastoral decisions. While a pastoralist will not involve himself in complicated computations in relation to the allocation of various uses to maximise output from his fixed resources such as land and, in the short to medium term, labour, it is believed that he generally understands these relationships.

The principle of common-use for optimum outputs is illustrated in figure 1. As can be observed from the figure, if a pastoralist increases the number of one species, the number of the other competing species will have to be reduced to maintain the same level of output from the two species. The hypothetical figures indicate that at the level of 12,000 sheep, no cattle are produced, shown by point A, while producing 3,800 head of cattle would mean totally forgoing the production of sheep, depicted by point E. AB depicts a situation where a few cattle could be added on a range that has been exclusively grazed by sheep, and the cattle will feed on forage plant species that the sheep were not using; so small lamb production will be given up for large calf production. BC is a situation where increased cattle numbers compete with sheep for the same forage plants; so high lamb production is given up for increased calf production. And finally, DE shows a situation where, as more and more of the sheep are removed, competition among the ever increasing number of cattle for a limited quantity of preferred species causes increased calf production to drop.

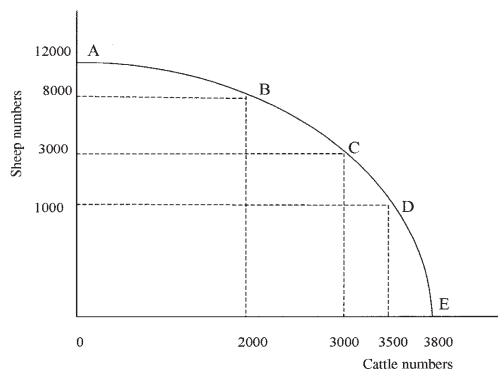


Fig. 1. Optimal numbers of cattle and sheep grazing on a non-uniform range

Large Livestock Numbers: Economies of Size or Simply Cattle Complex?

Economies or diseconomies of size are a result of the impact of increased output on average

costs.² Returns to size can be said to measure the change in output resulting from a change (not necessarily a proportionate change) in all inputs. If the change in output is less than the change in inputs, diseconomies of size result. If the change in output is equal to or is greater than the change in inputs, economies of size exist (Doll and Orazem, 1978). On the other hand, 'cattle complex' is said to be an attachment or fondness the pastoralists are perceived to develop towards their cattle.

Economies of size depend on the existence of indivisibilities, i.e., the impossibility of reproducing the operation on a reduced size without loss of efficiency (Livingstone, 1976; Upton, 1979). How real these economies are in pastoral livestock production is the question. One major economy of size is the location of grazing and to a lesser extent water supply. This is in relation to the size of territory to be occupied. This, for example, follows the most recent incidence of rain over the total land area in Kenya, particularly in the arid and semi-arid areas where rainfall and water supply are so uncertain. Thus, the more people and their livestock involved, geographically, the greater the possibilities of 'sharing' the available grazing and water. This economy of size has, in fact, always been appreciated by pastoralists in Africa whose nomadic existence has depended on the 'freedom of movement.' Where water rather than grazing is critical, this economy is reduced in importance if fairly reliable water supplies are provided as a result of investment in dams and bore-holes.

Pastoralists require sufficient numbers of livestock to assure their basic subsistence requirements throughout the year plus those for trade, social obligations and drought losses and, therefore, they attempt to maintain large herds (Campbell, 1981). Actually, many social scientists have argued that nomadic pastoralists keep too many animals, far beyond what the range can support. Large herds are then unable to survive drought periods of low vegetation production. Nomadic pastoralists, however, believe that large numbers of animals are vital to get through the drought periods. For example, it is thought that the Maasai community owns large herds as an insurance against drought losses. That is to say, the more animals someone keeps the better the possibilities that more of the herd will survive the

dry spell. Also, whereas livestock as capital (see Jarvice, 1974; Nyariki and Wiggins, 1999) have a value out of proportion to the labour input, it is also true that in a traditional system, where the herds are large, a large number of people are dependent on each herd.

It should be noted that in the range areas, traditionally occupied by pastoral communities, land holdings are large but their quality and the system of land-use are such that most of the holdings qualify as small on grounds of 'income' in terms of milk and meat production per herd. So, when discussing small-scale livestock production, reference should also be made to sedentary and migratory pastoral groups. The individually owned stock on the communally owned land in the two pastoral categories is kept primarily for milk and meat for subsistence but even the richer members of these societies tend to keep all their capital in the form of increased numbers of stock. Husbandry patterns are concerned with day-to-day needs of stock. The stock is herded to grazing and water, protected from attacks by predators and guarded from theft. Improved husbandry is practised only to a very limited degree, e.g., grass near the dwellings being preserved for the youngest calves, the cows with female calves being milked less than those with male calves, and rough pastures occasionally being burnt just prior to the onset of the rains to provide a flush of green grass. There are often no formal channels of saving and no control over the land. When resources are owned like this there can be little for the individual to gain from control of his livestock numbers in line with the available forage. Kaufman (1976) indicates that by reducing the size of the individual herds, these people increase the difficulty of re-establishing themselves after the inevitable catastrophes brought about by general overstocking.

Given the circumstances under which the traditional pastoral production exists – large numbers of livestock, large tracts of land, limited forage – economies of size cannot be realised. This is actually the real diseconomies of size (rather than scale) in that the animal numbers are expanded while forage availability is unchanged. In fact, in terms of forage availability and the capital employed (other than cattle capital), these production system is small-scale in nature. We

should however emphasise that efficiency could be achieved within the mentioned limitation related to pastoral production and within the context of defined goals. This is particularly important if we consider Kenya's pastoral production where goals are not solely monetary gain. As Oloya (1988) notes, the efficiency of an enterprise or the agricultural industry as a whole is measured by relating the value of the products produced to the cost of the resources used. Changes in economic efficiency can only be measured by considering the net value of marginal decisions. A small-scale producer is more difficult to change his adapted methods mainly because of the experience of regular and severe famines. He has, therefore, developed a 'security complex' and is more inclined to value a system that provides him with some defence against starvation in the likely event of famine than to adopt a new system that promises him plenty. This is quite relevant in pastoral systems and it explains the low level of technical efficiency in such systems.

Livestock as Capital: How do they compare with Conventional Capital?

A capital asset is a good that is devoted to the production of other goods. Therefore livestock, especially cattle, are capital inasmuch as they have the physiological capability to produce other livestock (Jarvice, 1974; Crotty, 1980; Nyariki and Munei, 1993; Nyariki and Wiggins, 1999). Cattle are considered as capital goods that are held by producers as long as their capital value in production exceeds their slaughter value. Therefore producers become portfolio managers seeking the optimal combination of different categories of animals to complement their non-cattle assets, given existing conditions and future expectations (Jarvice, 1974). This is the main reason why pastoralists tend to have a large number of females in their herds (see also Helland, 1984).

The differences between cattle capital and other conventional types of capital are that cattle produce other capital whereas conventional capital, say, tractors do not produce other tractors. Other than age, depreciation of cattle capital is through mortality. In a pastoral context, cattle capital, unlike most other capital items, produces a variety of consumer goods, for instance, meat,

milk, hides, blood, etc. As alluded to, this is, however, not limited to cattle capital alone.

Pastoralists use various techniques to maximise the production of cattle capital. They have, as we have mentioned, as many females in their herds as they can. They want to have calves all the year round if possible unlike in commercial ranching where calf crop period can be predicted. Also, there is incorporation of different species (discussed in more detail later) depending on the environment, mainly due to the fact that pastoralists' demand for meat is high. This saves cattle as capital. Pastoralists are 'family capitalists' and not 'aggregate capitalists.' They leave cattle ownership to be under the management of individual families.

Anthropologists and socio-economists emphasise the many roles of cattle in the African pastoral society (see Crotty, 1980; Nyariki and Wiggins, 1999). Most important is their role as money. The borrowing and loaning of cattle (also discussed in greater detail below) is seen as, *inter alia*, a means of cementing friendships. Cattle have important advantages as money in a predominantly pastoral economy. They are directly useful, as sources of milk, meat and blood. They do not have to be converted first, like coins, into consumable products, that may not always be available in vast country with poor communication and little commerce. Like money on deposit, they increase and multiply, at little cost or inconvenience to the owner; but unlike currency they have an in-built hedge against inflation.

Most important to a people frequently and necessarily nomadic, cattle are mobile. While other stores of wealth, including coins, must be transported from place to place, cattle move themselves, and can also transport other forms of wealth. One other most important use of cattle as legal tender is in paying bride price. For these reasons, cattle are an attractive asset for pastoralists to hold. This attractiveness confers on the holders of cattle in a pastoral society security and status, as money in the bank does in sedentary societies.

Social Alliances: The 'Economy of Affection' or Risk Management?

The 'economy of affection' should not be literally understood. It is not related to fond emo-

tions *per se*. Rather, it denotes networks of support, communications and interactions among structurally defined groups that are related by blood, kin, community or other affinities, for example, religion (Hyden, 1986). This type of economy, which has also been described by Scott (1976) as the 'moral economy,' springs from the needs and dynamics of micro- rather than macro-structures, and it is important in any egalitarian society, where people are not cut off from access to the control of some land. In most parts of the world, the economy of affection has been reduced to an ancient antique. However, in most parts of the African continent, productive and reproductive processes at the household level, more especially those involved in pastoralism, are still embedded in the economy of affection. With some degree of independence and autonomy of the pastoral production household unit, members of each household generally co-operate with each other to safeguard physical and social reproduction under conditions of marginal survival potentials.

Animals are used by pastoralists to enhance social relations in addition to meeting household requirements. The pastoralists maintain a variety of social linkages both within their own society and between themselves and adjacent communities. This is done through livestock transfers to friends and kin as loans. These are designed to reduce the effect of adverse environmental conditions, disease or external threats. So, families whose herds were lost during drought could approach their affines for support to rebuild their herd. Social relations are particularly useful when one considers the fact that no insurance facilities or banks are readily available to pastoralists.

In communal grazing societies without well developed markets on which to sell surpluses, as found in most parts of Africa, emphasis on sharing among members of the group tends to discourage accumulation contrary to what many people are made to believe. The communities cope with increasing population density through customs and traditions that regulate marriage and other forms of behaviour.

The economy of affection may, however, be waning in importance as capitalistic economic influences, as we know them today, continue to impact pastoral societies, thereby instilling indi-

vidualistic behaviour in them.

Ownership of Grazing Land vis-à-vis Livestock: Conflicting Property Rights?

Literature on property rights abounds. Most of it has discussed the rationality or irrationality of the actions of those who exploit property that is commonly owned, such as grazing lands in pastoral areas in Africa. A great number of social anthropologists have defended the rationality of common property users, but with lack of unanimity. A few agricultural economists have also done the same. There are nevertheless a number of economists who support the idea that the users of common resources are rational and efficient under their conditions of production (see, for example, Livingstone, 1977).

Livestock in pastoral systems are owned by individuals but natural resources (inputs) for livestock production such as grazing, water, etc., are under communal control. In the pastoral context of land ownership, communal ownership (*res communes*) refers to a distribution of property rights in resources in which a number of owners are co-equal in their rights to use (not to transfer) the resource. The property right is, therefore, non-exclusive (to members) and anyone (who is a member) is free to use the natural resource. Resources held like this, such as the common grazing lands, have been referred to as the 'commons.' However, as economists, we should be careful in the use of the concept of commons. The concept should be used where institutional arrangements exist since common property is not 'everybody's property.' This implies that potential resource users who are not co-equals are excluded. The concept of 'property' – a bundle of rights in the use and transfer through selling, inheritance, etc. of a resource – has no meaning without this feature of exclusion of all who are not either owners themselves or have some arrangements with the owners to use the resource in question (Ciriacy-Wantrup and Bishop, 1975). If exclusion cannot be enforced, then the condition of open-access exists. In the case of open-access property, no one can prevent another from using the natural resource and appropriating a share of the returns to the resource. Again, we should be careful not to assume that a common property, such as grazing land, is necessarily open-access property.

Open-access characteristics exist by degree where property rights are not fully defined over the various margins of production. In fact, in practice, property rights will rarely be complete, in part because of the costs of defining and enforcing those rights. From a social wealth-maximisation point of view, the precision of the rights structure depends on the balance of expected social gains and the costs of negotiation, measurement and enforcement. Since net costs vary across resources, depending on their expected value, physical characteristics, and distribution implications, property rights will vary (Libecap, 1986).

How does the presence or absence of exclusivity impact on resource use from an economic point of view? It is argued that with private property rights, markets for production and exchange exist. It is then possible to obtain efficient allocation of resources without external (e.g., government) intervention.³ Private markets are said to function well in most cases. By contrast, it has been contended that resources characterised by common property rights cannot achieve efficient allocation of resources without some external intervention and or the creation of a property right (Hardin, 1968; Alchian and Demsetz, 1973; Libecap, 1986; Livingstone, 1977). Markets for the production and exchange of these natural resources either do not exist or operate inefficiently. It should be noted however that, on the one hand, exclusive property rights are developed mainly because the property in question can be easily delineated, or the resource is highly valuable (or scarce). On the other hand, common property rights exist mainly because the resource in question is not easily divisible, or to get payment for the use of the resource is difficult. In other cases, such as grazing lands in arid regions, it is optimal not to establish private property rights. This is because transaction costs are higher than the benefits.

Private Livestock under Common Land is a Rational and Efficient Arrangement

Communal ownership of land implies that the individual owner cannot decrease the pressure on the grazing land by reducing his own herd. In other words, the individual has no guarantee that other users of grazing will follow suit when he

restrains himself from overuse.

Production efficiency can be realised under common land ownership. This has been supported, at least indirectly, by empirical evidence from the study by Behnke (1987). Behnke compared the proportion of steers in large herds held on communal land with the number of steers in herds held on freehold ranches. Land tenure on the latter is private rather than communal, and many of the livestock holders achieve a relatively high standard of management based on perimeter fencing, paddocking, and piped water. Figure 2 shows a comparison of the relative number of steers in herds of comparable sizes held on communal land and on freehold ranches. The comparison indicates that for herds between 120 and 240 head, communal-land herds had more steers than comparably sized ranch herds. The

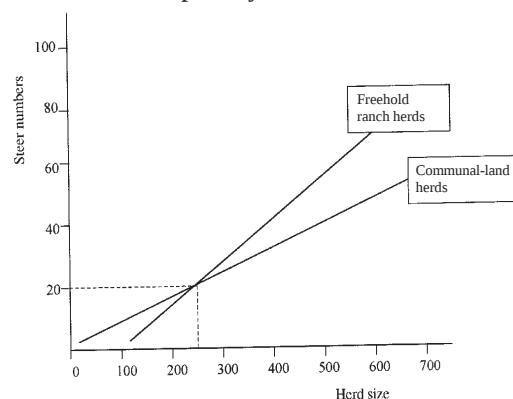


Fig. 2. Steer numbers by herd size on communal and private lands

Source: Adapted from Behnke (1987)

relationship reversed for herd sizes above 250 head. From this point on, ranch herds tended to contain more steers than their communal-land counterparts. Behnke concluded that the relative scarcity of steers in large communal-land herds suggested that herds are not held for commercial exploitation. On the other hand, the structure of large ranch herds was consistent with the attempt by their operators to maximise commercial profits. If we argue from the objective maximisation point of view, communal landowners, who are pastoralists in this case, have milk production for subsistence as their main objective. So by keeping fewer steers and more heifers in herd sizes similar to those on private lands, the structure of

the pastoral herd is also consistent with the operators' objective of maximising milk production for food security. By implication, they are realising efficiency in production.

Communal ownership of grazing has been attributed to overstocking in pastoral production systems. Livingstone (1977) gives a simple economic explanation of this situation. He indicates that overstocking is likely to arise out of the divergence between private and social (group) interests in the holding of cattle. So long as land is owned communally, it pays an individual to maximise his own holding of cattle. The individual has no interest in restricting his own stock in order to preserve grass since, if the rest of the community does not follow his example, there will be no significant effect on the total numbers of cattle being grazed on the land, and he will personally suffer a loss. This is true even if all members of the community would gain in the longer run from a reduced aggregate herd and improved pasture. This reasoning has been supported by many, including Widstrand (1975) and Stryker (1984). Widstrand contends that "as grazing is communal and the ownership of or rights to the milk and offspring of cattle are individual, the perceptions of nomad livestock owners of the options open to them leave them little choice but to increase the size of their herds, even if that course leads to ecological disaster."

The Efficiencies of Common Grazing Rights

Collective property rights have been variously supported by economists as having played socially beneficial roles in natural resource management from economic pre-history up to the present. However, as Ciriacy-Wantrup and Bishop (1975) state, common property institutions have been misunderstood by modern-day economists. Specifically, the 'theory of common property resources' or the 'tragedy of the commons,' first propounded by Hardin (1968), epitomises the misunderstanding of these institutions. This theory can be summarised by the maxim 'everybody's property is nobody's property.' That is to say, when a given natural resource is physically and legally accessible to more than one resource user, the result is said to be free-for-all. In this case, therefore, users compete with one another for a greater share of the resource to

the detriment of themselves, the resource, and society as a whole. This idea has been applied to an array of resources including grazing lands, fisheries, forestry, etc.

A host of economists maintain that the common property condition is largely to blame for most of the social ills, including resource depletion, pollution, dissipation of economic surplus, poverty among resource users, backwardness in technology, and misallocation of labour and capital. The solutions proposed by these economists are (1) to make the common property resource in question the private property of individual resource users who, through the 'invisible' or 'hiding hand', will manage the resource in the best interests of society; and (2) governmental interventions through taxes or subsidies designed to bring private and social costs into balance or by direct governmental controls of inputs and outputs or both. However, this is not an adequate picture about commonly owned resources. And, as already mentioned, one source of misunderstanding is that of the term 'common property,' a term that has been used in a manner often at odds with the meaning of the concept. Common property is owned property: an example is grazing land. Non-owned property is not common property because nobody lays a claim on it: an example is fisheries in the high seas. So, describing such fisheries as common property that has open-access conditions is a contradiction in terms. Some of the economists who have contradicted this term include Berk and Perloff (1985).

Various economic theories could be advanced to explain why common property does not necessarily lead to economic inefficiency. These theories could further be used to indicate that even where open-access conditions prevail, economic efficiency could still be achieved. For example, in an open-access fisheries, the supply curve bends backwards. Thus, a fall in price created by the entry of a fish farm increases rather than decreases supply in the backward-bending portion of the supply curve. The implication of this theory is that fish farms are more likely to be unprofitable the more heavily over-harvested is the resource that possesses open-access conditions, in a competitive market. This is also true of pastoral production (Fig. 3).

In Figure 3, the backward-bending supply

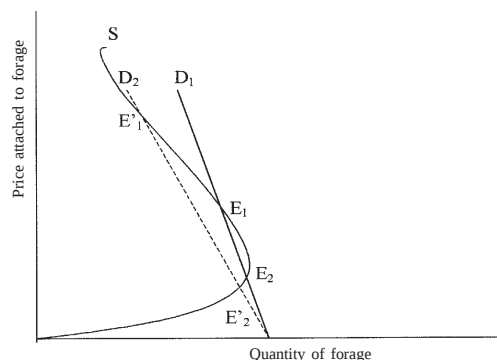


Fig. 3. Open-access grazing land equilibrium

curve, S, illustrates the possibility of over-harvesting forage through livestock grazing. The demand curve D_1 illustrates demand in the absence of an extra herder while D_2 shows the residual demand curve after a herder enters. Where open-access to a resource exists, the higher prices are always associated with fewer stocks of the resource.⁴ If the initial equilibrium in figure 3 is at E_1 , where there is a relatively higher supply of forage and therefore less overgrazing, the entry of a herder can cause the equilibrium to shift to E'_1 , where there is a lower level of forage available per unit livestock and a higher price attached to the forage due to a higher price of livestock caused by a lower supply. The increased number of herders could also cause the quantity of supply to move to E'_2 .

From the point of view of society, the move from the high-forage/low-stock to the low-forage/high-stock equilibrium will lead to a higher price attached to the forage and a higher level of its supply (through causing some of the herders to exit) which will reduce the pressure on grazing lands. This is why a commons that possesses near open-access conditions may be a natural barrier to entry. However, this may also cause short-run gains (through better livestock) to the existing herders (due to the reduced pressure on grazing), thereby improving their welfare.

The most ardent supporters of privatisation as a solution to the 'common property problem' have been Davis (1971) and Ruthenberg et al. (1974). Ruthenberg et al. contend that what needs to be changed is the concept of 'private cattle on common land' which leads to overgrazing and the consequent degradation of the rangelands.

Davis argues that by assigning definite property rights to specific individuals or groups the consequences of misuse and the returns to investment in future productivity are both made specific to the holders of those property rights. However, Livingstone (1986) argues that there are gaps in this logic, which has also not been combined in an adequate way with the technical and empirical evidence available. Livingstone, after analysing the rationality of the pastoralists' accumulation of livestock, concludes that pastoral production is based on rational economic considerations of survival. On survival, the pastoralist's first concerns are to preserve a viable minimum size to ensure regeneration and in drought periods to enable rebuilding his holding. On investment with respect to accumulating livestock, rationality should be seen in relation to a process where high rates of return are obtainable during good years but subject to risks of calamitous drought, in a situation where carrying capacity is a variable rather than a fixed quantity. The common property model assumes the absence of co-operation and takes for granted what is in fact uncertain evidence regarding long-term degradation of rangelands.

Herd Dispersion: Ensuring Proper Distribution and Spreading Risks

Pastoralists divide household stock into home-based and satellite herds. The former, which are mainly lactating cows and young calves, are attached to the main camps while the latter, mainly composed of dry-cows, castrates, and weaned calves, are grazed in outpost camps. Thus, by moving substantial numbers of stock away from the main camps, the rate of use of pastures around camps and dry-season water-holes is minimised.

Herd dispersion has many other implications in the management of rangelands. As a result of fluctuating rainfall and limited water availability, each range area is used only for a short period. In this manner, forage vegetation remains in a good condition because this strategy improves plant growth and vigour. Unless there are co-operative ways of dispersing one's herds by combining them with animals belonging to others, optimum herd size does place limits on the amount of animals one person can own.

As Jahnke (1982) indicates, animal dispersion,

accumulation, diversification, and sharing with relatives are a natural response to risk management. Immediate destitution is a risk that herds-men face several times in their lives. The herds-men have devised the above discussed strategies for dealing with such a situation (see also Nyariki and Wiggins, 1999).

Ex-Ante and Ex-Post Management of Livelihood Insecurity through Livestock and Fallback Activities

Pastoralists use livestock to enhance their capacity to manage the risk of and cope with livelihood insecurity by engaging in livestock exchanges for grain. One of the strategies is to keep a variety of livestock, in addition to cultivation (in the case of agro-pastoralists). For example, in the Kamba agro-pastoral community in Kenya, livestock sales of all categories are markedly increased during drought (Nyariki and Wiggins, 1999). Pastoralists usually enhance their survival by engaging in agriculture, hunting, seeking jobs outside the pastoral system, and by depending on the 'modern' (money) economy. In some instances, it has been government policy to encourage the pastoralists to adopt cultivation of grain crops. This is done in the hope that a change in dietary requirements will reduce dependence on livestock and thus the need to keep large herds. However, the reverse may be the result. For instance, some pastoral communities have been known to reinvest money earned from grain sales in livestock, thus exacerbating the problem of too many animals. Where cultivation has been adopted with some degree of success, especially in areas (e.g., some parts of Makueni District in Kenya) where drought-tolerant crops are grown (transforming pastoralists into agro-pastoralists), useful complementary effects between livestock and cultivation have been observed (Nyariki, 1997).

Another fallback measure by pastoralists is migration from the pastoral areas. Many young men having suffered livestock losses migrate to towns in search of salaried employment. This migration has caused serious problems of labour shortages in the pastoral systems. Pastoralists also gather wild fruits, dig out roots and plant tubers during drought, in addition to hunting wild animals like antelopes, wildebeests, and other

herbivores for their meat. It is believed that during the 1930s, 1940s, and 1950s those from the Gabbra and Boran communities in Kenya who fed on wild fruits, roots and plant tubers survived while those who fed on meat of starving cattle died of malnutrition.

PRESENT CURRENTS

Pastoralists are said to have suffered increasingly appalling deprivation over the years, so that at present they are among the poorest of the World's poor. The most critical problems, as already discussed, are to some extent endemic in the ecological niche they are found. The long dry season takes a heavy toll on livestock and in many cases on human life as well.

It is now generally accepted that pastoralists are experts in mastering a complex and harsh environment, in harnessing marginal and constantly moving resources to support human life. These pastoralists have been subjected by 'modernists' to various 'development' efforts to alleviate their poverty. However, livestock projects initiated to try and achieve this have had the worst failure rate of all in Africa. In 1985 a confidential World Bank report surveyed the record of 330 projects partly or wholly concerned with livestock components. Economic rates of return ranged between 6% in East Asia and 16% in South Asia. In East Africa, pre-project assessments predicted an average rate of return of a healthy 13.3%; however the projects turned in losses averaging 1% a year. In west Africa, the results were even worse; profits of over 19% were predicted but instead, on average, the projects lost 3% a year (Goldschmidt, 1981).

Reviewing two decades of experience, Goldschmidt was led to comment that "the picture that emerges is one of almost unrelieved failure. Nothing seems to work, few pastoral peoples' lives have improved, there is no evidence of increased production of milk and meat, the land continues to deteriorate, and millions of dollars have been spent."

What emerges from the widespread failure of development projects in pastoral areas is that development interventions have been characterised by general ignorance about pastoral systems. The failure of the projects can mainly be attributed to the stereotype views and percep-

tions about the African pastoralists and their environment held by modernist researchers, policy makers and project implementers (see, for example, Hendrickson et al., 1998; Leach and Mearns, 1996). These perceptions represent African pastoralists as economically irrational, unresponsive to development, environmentally destructive, and identify their poverty and dispossession as self-created. These views have persisted to the present day.

The present currents regarding pastoral development present a credible challenge to the belief that pastoralism is economically unproductive and environmentally unfriendly in the arid and semi-arid lands. As already discussed, a better understanding of the complex way in which pastoralists interact with themselves and their environment puts doubts to rest as to their ability to act rationally. The foregoing discussions have underscored the economic rationality and functioning of pastoral production systems, which are by and large consistent with the economic and physical productivity of arid and semi-arid lands. Thus, it can now be asserted that, taking account of the extreme production uncertainty brought about by the highly unstable climates in pastoral areas, the survival of pastoralists is mainly dependent on acquiring, maintaining and managing large herds of livestock, primarily founded on mobility, diversity, the economy of affection, redistribution (through social alliances, raiding and fission), and other adaptive means.

As has happened in many areas before, to sedentarise pastoralists whose economy is rationally embedded in the concept of mobility borders on carelessness. For example, several attempts have been made to settle the Turkana herders of northern Kenya on agricultural schemes and fishing villages in an effort to reduce hunger or avoid famine, improve the environment and strengthen livelihoods. But instead, this more often damaged both the environment and the people through a poor understanding of indigenous strategies and experiences of self-reliance, which are well adapted to risky dryland environments (Hendrickson et al., 1998). Thus, by restricting the traditional mobility of herders and concentrating people and their livestock in a few limited areas of land, development interventions have themselves been environmentally destructive.

Another effort to sedentarise pastoralists has been to individualise (privatise) land. It has, however, been observed that an attempt to privatise land has led to landlessness among some pastoralists in Kenya. A case in point is the Maasai neighbouring the Kisii and Kikuyu communities. The more astute, more enterprising Kisii and Kikuyu cultivators have bought large portions of maasailand, exacerbating the problem of too many animals on reduced per capita land area.

Whilst we have seen that there is economic rationality in the way pastoralists go about securing their livelihood, it does not imply that they cannot use assistance from outside to improve their economic condition. It is how this assistance is given that is the issue. It is important to pause and observe that the conclusions we have reached on the current conceptual state of pastoral livelihoods and development emphasise flexibility, diversity and the affected people's perceptions. These themes are also found in rural and industrial development, planning, public administration, and other areas of development studies. They are also the themes of post-modernism (see Rosenau, 1992). Post-modernism is ubiquitous but difficult to define. It is better understood by what it rejects. Post-modernism rejects the scientific domination in rational thought, the new scientific forms of social organisation, the scientific method (with its emphasis on hypothesis testing), among others.

To better understand pastoralism, we suggest that we turn to post-modern approaches, which entail subjective interpretation and value local knowledge, rather than scientific methods of inquiry and empirical testing. The post-modern approach will perceive the underlying problems of pastoral development as complex and diverse, not simple and uniform. The objective will be development (as we now know it), not economic growth. The research approach to understanding the pastoral economy is listening, participatory rural appraisal, holistic, induction, complex reality, and disaggregation; not measures, surveys, reductionism, deduction, abstract models, and aggregation. The planning approach is to enable, to interact, to decentralise, and bottom-up; not to plan, to model, to centralise, and top-down. And implementation is through a process, a task culture, and flexibility and innovation; not

through a blueprint, a role culture, and standardisation.

CONCLUSIONS AND POLICY IMPLICATIONS

In much of the arid and semi-arid region in Kenya, livestock production still remains the principal viable means of livelihood, in a situation where there is little capital to invest in other activities, such as irrigation. The main ways of alleviating poverty and food insecurity in these areas are, therefore, to encourage, through support and development, sustainable indigenous and or new livestock production technologies and management practices, that suit the subsistence-oriented pastoralists or agro-pastoralists and their environment. We cannot, for example, recommend settlements in these areas as a blanket policy. Neither can we recommend universal land privatisation. In most of the range areas, mobility is an important tenet of pastoralism as it has inherent efficiencies. Mobility reduces the highly seasonal aspect of plant growth, extending the period in which less mature, more digestible forage is consumed. In the process, land becomes a variable rather than a fixed resource. We have also seen the advantages and disadvantages of communal land ownership.

KEYWORDS Pastoral Development. Pastoral Economy. Herd Management. Property Rights. Livelihood Security.

ABSTRACT In this paper we examine African pastoral production systems mainly from a socio-economic viewpoint. By and large, we find that this economy is consistent with general economic principles. All pastoral practices are rational based on the difficult environment and the cardinal objectives of subsistence and survival. We then argue that the implication of this in terms of pastoral development in its correct sense is to introduce technologies that are built on, among others, principles of flexibility, diversity and the perceptions of the people concerned: the pastoralists. The post-modern thinking is not to reorganise the structures of pastoral production but to understand them with a view to enhancing and complementing them.

NOTES

1. A livelihood is defined as the 'activities, the assets, and the access that jointly determine the living gained by an individual or household' (Carney, 1998).
2. Note that costs need not be in cash. In pastoral production systems they are mainly in terms of

- labour for herding, protection, etc.
3. Note that efficient allocation of resources is obtained through the maximisation behaviour of firms.
4. Price here does not have to be in the form of cash but the value the pastoralist attaches to forage through his livestock products – milk, meat, blood, etc.

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