

TRADITIONAL AFRICAN RANGE MANAGEMENT TECHNIQUES: IMPLICATIONS FOR RANGELAND DEVELOPMENT

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Introduction

In adapting to a harsh and variable physical environment, the African pastoralist has developed principles and strategies for managing natural resources. Recently the pastoralist has had to face new external pressures, such as crop expansion into high quality rangelands, nationalisation of land by governments, population increase, forceful sedentarisation, and indiscriminate water development. These problems have been compounded by a relentless series of droughts. These external pressures have contributed to pasture shortages, land degradation, and socio-economic disintegration. Although many pastoralists are changing their ways (for example diversifying into crop cultivation, sending relatives off for urban wages, or engaging in commerce and trade) many continue to manage their livestock in the old way. But in many areas their traditional system of management is no longer able to cope with the shortage of pasture and instead is adding to the problem of land degradation. In addition, traditional management knowledge is gradually being lost as more of the younger generation of pastoralists are attracted to urban areas. Yet the traditional system had developed an intimate knowledge of the environment and many successful techniques that could still be of use today.

A literature survey was commissioned by the Food and Agriculture Organization (FAO) of the United Nations to collect details on traditional African natural resource management, to investigate the survival of traditional techniques and to evaluate their potential for the development process. The study collected information on: (i) pastoral knowledge of the physical environment (e.g. names of plants and soil types), (ii) daily natural resource management techniques (e.g. which type of tree or pasture to use, when and why), (iii) the social control and organization of daily management (e.g. communal grazing controls), and (iv) the socio-political structure of resource management (e.g. resource tenure issues)¹. This article covers only daily range, water, and herd management techniques and the social control of daily management.

¹ Copies of the full report, entitled *Community Forestry: Herders' Decision-making in Natural Resources Management in Arid and Semi-Arid Africa* can be obtained from the Community Forestry Unit, FODP, FAO, 00100 Via delle Terme di Caracalla, Rome, Italy.

Traditional Herd Management

The main production objectives of pastoralists are not just increasing herd size, but also increasing milk yield, maintaining an appropriate herd structure for short and long term reproductive success, and ensuring disease resistance by selective breeding (Monod 1975:75). The priorities given to each goal will change depending on a household's particular circumstances. For example, among the Somali, a young family with young children will try to maximise milk, while an older family with older children will try to maximise marketable slaughter animals (Behnke and Kerven 1984:65). Development objectives must take this heterogeneity into account. Such heterogeneity reflects and at the same time enhances a diverse production base. The flexibility of the system is an insurance policy that sustains the livelihood of a family and therefore a sustainable production base, throughout the years.

Pastoralists always try to maintain a diverse portfolio of livestock designed to meet their needs and to fit the environment. Each type of animal fills a specific objective of the pastoral family. Large animals (cattle and camels) are raised not so much for their meat as for their milk, but they are also the 'bank account' and 'security deposit' of the pastoralist. Unlike Middle Eastern breeds, African sheep and goats are not kept primarily for their milk but for their meat, their 'liquidity', and to a lesser extent, their hair (which some groups such as the Twareg weave into carpets and blankets). Other animal products are certainly valued (such as manure and hides) but do not seem to factor in pastoral decisions on the composition of their herds.

African rangelands are characterised by a diverse floristic mosaic. Patches of edaphic grasslands and pure shrub thickets can be mixed with open canopy savannas and wooded Acacia steppes. On the fringes of ecosystems, the ecotones can be sharp or gradual, in both cases resulting in very special and diverse flora. Modern ranchers in East Africa, raising solely cattle, have had to expend much capital and labour for bush clearing in order to maintain the grasslands. This is in marked contrast to the traditional African pastoralist who accepted and adapted to environmental diversity by having a herd of mixed species. Cattle and sheep rely in large part on grass (but also some forbs and browse especially in the dry season), while camels and goats rely mainly on browse (Le Houerou, 1980).

Herd splitting, the practice of dividing the livestock into separate herds depending on their age, sex, type and productivity, is widely practised. Pastoralists frequently separate large ruminants from small ones, as among the Rendille of Kenya (Fratkin 1986:276), herd camels together with sheep, and cattle with goats, as done by the Twareg of Niger (Winter 1984:554), and separate livestock into a 'milk' herd (mostly milking and pregnant animals and their young), and a main or dry herd, as among the Fulani of northern Senegal

(Diop 1987:99) and the Dinka of Sudan (Niamir 1982). Herd splitting results in increased niche specialisation, in reduced competition among livestock for the same vegetation and in a dispersion of grazing pressure as each type of livestock is taken to the pasture which suits it best. Those who do not split herds often do not have enough livestock or herders, or both. Herd diversity and splitting are techniques that can be used to maintain the long term productivity of the range, to ensure sustainable production at a comparatively low cost, and in some cases to improve degraded rangelands. For example, the Maasai herd their flocks of goats in such a way as to reduce bush encroachment (Jacobs 1980:287).

Herding is the art of guarding and conducting livestock. Among the Fulani of Mauritania and Senegal, the herder guards animals by moving livestock against the wind so that they can smell predators. The art of conducting includes night grazing, never allowing livestock to drink at noon especially in the dry season, and learning all the signs, cries, and songs needed to 'talk' with livestock (Ba 1982:37). Not everyone has the same aptitude and skill in herding. For example, among the Samburu of Kenya, the more distant pastures are under-utilised because they are only used by the more energetic and better managers (Spencer 1965:8). The art of herding may be fast disappearing as more and more young people leave the range, but the alternative to herding - fencing - is not feasible for the majority of pastoralists. Development programmes should therefore encourage herders to stay on the range, retraining them with a combination of viable traditional and appropriate modern techniques.

The role of women in herding livestock is an aspect that has long been neglected, mainly because of the assumption that men were responsible for livestock and women for cultivation. In some cases women and young girls are responsible for herding sheep and goats and milking all animals, while men and/or boys are responsible for herding cattle or camels. This division of labour is characteristic of Kikuyu agropastoralists (Middleton and Kershaw 1953:21), the Pokot of Kenya (Barrow 1988:1), and the Tonga of Zambia (Colson 1951:125). In a few cases, women are responsible for both small ruminants and cattle, but not camels. However, they will often herd small groups of camels without male assistance, or may travel with the men and help them in herding and watering the camels (Behnke and Kerven 1984:37-59). The fact that Somali women prefer herding to farming - because they say it is less harsh on the body (Putman 1984:174) - suggests that women may start to have a more important role in herding as men leave pastoral economies for urban wages and other attractions. Very little information exists on the role of women in pastoral production. A crucial and still unresolved issue is whether range management systems change as women's role increases, and if so, what implications these changes may have on the sustainability of the production system.

Traditional Range Management

Although the quantity and quality of water and forage are of paramount concern to pastoralists, other factors also determine movement patterns. These factors include the location of salt licks, soil conditions, other environmental factors (such as dew, excessive heat, lack of shade, presence of wildlife), avoiding pests and diseased areas, avoiding damage to crops, proximity to markets, household labour availability, cultural gatherings, territorial boundaries, and social relations with neighbours (especially alliances and enmities). All of these factors introduce a high degree of flexibility into pastoral movements, which is often interpreted by development workers and governments as inconsistency and irrationality.

Mobility is one of the best adapted and effective means of obtaining what livestock need in an ever-variable environment. In the traditional African context, movement is not chaotic but is regulated by socio-political controls and technical know-how. It requires access to large areas of rangelands which most groups obtain by a combination of territorial rights and alliances with neighbours. Herders from the same social unit are usually free to use any part of their territory, but in practice confine themselves to the range they know best, and prefer to stay with the same group of people, especially relatives. This usually ensures a continuity and consistency in range use by the same managers.

Most pastoral groups have several types of range management techniques including pasture rotation/deferment and grazing reserves. These techniques are frequently used to save forage for critical periods. For example, the Zaghawa of Chad move their sheep and camels north to Sahara pastures in separate parallel paths, leaving ungrazed a portion of the range for their return journey to the south (Tubiana and Tubiana 1977:53). Except during a drought, the Pokot defer using areas with termite-resistant grass during the wet season in order to preserve good fodder for the dry season (Ostberg 1987:48). The Maasai will widen their grazing radius and delay entering the dry season areas by using donkeys to transport water (Jacobs 1980:287), and in Amboseli National Park this strategy has been shown to increase the total carrying capacity by 50% (Western 1982:191).

Apart from such large scale rotations, herders also have formal and informal rules regulating the frequency of daily movements and camp locations. For example, the Wodaabe Fulani use lunar cycles to time their movements to new pastures, which in effect results in moving camp every 2-3 days and moving out of an area every week. This system is apparently common to all Fulani groups, but the Wodaabe observe it more strictly (Stenning 1959:56,212). The Fulani of northern Nigeria say that they must move camp at least four times each season (they recognise five seasons) to prevent over-use (Adegboye 1978:64-65).

Herders also closely monitor their livestock and environment for signs that indicate a need to move and the best direction to go. For example, the Wodaabe

monitor livestock faeces, milk yield, animal weight, and the number of cows in heat to evaluate the quantity of forage (Maliki *et al.* 1984:260). The Fulani of Mauritania evaluate the quality of the range by taking the livestock to the same pasture on an experimental basis for seven consecutive days. During this time they examine the soil types, the presence or absence of key forage species, the behaviour of livestock (sleeping pattern, eating schedule and the quality of skin and hair, etc.), and presence or absence of wildlife. Good pastures, for example, support gazelles and wild boars, bad ones are inhabited by vividly coloured lizards, and pastures used by elephants and ostrich are good only in the dry season (Ba 1982:26-28). There are also many indicators for monitoring pasture degradation. For example, the Samburu observe grass and browse availability (Spencer 1965:17), and the Fulani of Mauritania monitor specific plants and wildlife (Ba 1982:24-28). These traditional environmental indicators are still in use and have become more pertinent as resource shortages have increased.

Up to now, these traditional rangeland monitoring systems have not been used in the development context, perhaps because they did not fit into the classical fenced 'ranch' model. Their effectiveness, enhanced by modern husbandry techniques and the relatively low cost of hiring herders as local range monitors, are advantages that can form an integral part of more effective range development programmes. A parallel trend in American range management circles, which is beginning to emphasise intensive daily monitoring and management rather than reliance on theoretical carrying capacity calculations, may help to bridge this gap in development thinking. Local herders and scouts should also be considered as field implementors of environmental monitoring programs and early warning systems.

In some ecological zones, rotation strategies can also be used to increase rangeland capacity by deliberate overgrazing. For example, the Fulani of northern Sierra Leone practice 'shifting pasturage'; they overgraze one area for 2-3 years then move elsewhere and rest the first area for 15-20 years (Allan 1965:301). The Sukuma (south of Lake Victoria) do the same but allow a rest period of 30-50 years (Brandstrom *et al.* 1979:35). However, not all ecological zones can withstand overgrazing. For example, in case of overcrowding, the Fulani of Nigeria send their surplus livestock to neighbouring territories where they have alliances (Bourgeot 1981:67). The traditional range supervisors of the Tswana of Botswana were responsible for monitoring the range for overcrowding, and would suggest solutions to the community for allocating more rangeland or moving some herds out of heavily used areas (Odell 1982:8). Unfortunately, the information on traditional rotation strategies is very limited, perhaps because very few range managers have been interested in studying traditional systems.

Grazing reserves may be exceptions rather than the rule in Africa, but they have been found among more pastoral groups than previously thought.

Some areas are formally declared as grazing preserves or livestock passages where no cultivation is allowed. These efforts to stop the encroachment of crops into rangelands has been documented among the Macina Fulani (Gallais 1967), the Tonga of southern Zambia (Allan *et al.* 1948:94), and the Luo of Kenya (Coldham 1978:93). Some reserves were set aside to save fodder for dry seasons, as among the Sukuma of southern Lake Victoria (Brandstrom *et al.* 1979:35), the Twareg of Ahaggar (Swift 1975:448), the Il Chamus of northern Kenya (Little 1984:206), and the Berbers of Morocco (Artz *et al.* 1986:7-11). Groups such as the Rendille of Kenya (Lusigi 1984:345) and the Tilemsi of Mali (Gallais 1972:358) reserved certain areas for drought years. In the latter case it appears that the drought reserves were eventually abandoned because the pastures were invaded by toxic plants, possibly due to over-rest. Finally, some groups closed off degraded pastures for several years to allow regeneration, such as the Berbers of Morocco (Artz *et al.* 1986:11) and the Chiefs of northern Burkina Faso, who could order the closure of wells and other water points (Ware 1977:186).

Unfortunately, most grazing trails have tested western models and formulae rather than assessing the viability of traditional rotation and mobility systems. Circumstantial evidence of the usefulness of these rotation strategies is provided by the land degradation which has usually followed their abandonment.

Although these traditional techniques are gradually disappearing, many of them can be revived and can form the basis of rangeland development. However, there are certain important constraints. One such constraint is the nationalisation of rangeland, which effectively promotes legal 'open access' to land and poses no restraints on crop expansion or abuse by herders, both resident and non-resident alike. Although some form of communal local level rangeland tenure is probably a necessary condition, it cannot itself result in resumption of traditional range management practices. Other constraints, especially those causing the disintegration of grazing cooperation and social controls (see below) must also be addressed.

Traditional Well Management

A few pastoral groups have formal organisations for controlling and managing communal wells. For example, the northern Somali have an elected committee of 3-20 water managers who allocate water to the community and guests, guard the well, enforce and devise rules of use, charge fees, and maintain the well (Putman 1984:169). The Borana of southern Ethiopia have a council of well users that appoints a 'father of the watering order'. He regulates daily use of the well by appointing two men to supervise the livestock, a man to sweep and clean out dung, a man to coordinate the work of the 15-20 men and women who

draw water and pass it along to a common basin, and someone to plaster the basins with clay every morning (Helland 1982:251-252). These organisational structures can be used to manage newly constructed boreholes, if the ownership of the well is officially transferred to the local people and if the users are trained in its maintenance.

Traditional Formal and Informal Social Controls

Coordination among herding units is ensured by a higher level of authority and occasionally by a set of formal rules. For example, according to Somali rules, large ceremonies are held only when and where there is enough pasture and water to support those attending (Behnke and Kerven 1984:199). The Wodaabe (Stenning 1959:53) and the Masaai (Jacobs 1980:286) have similar rules. The council of elders of the Il Chamus of Kenya enforces grazing controls through informal 'police' chosen from members of the 18-30 year old age set (Little and Brokensha 1987:200). The Berbers of Morocco had a chief of grass who made final decisions concerning common grazing, such as the timing and location of movements, deferring grazing, and granting permission to outsiders (Artz *et al.* 1986). The Dina Code of the Macina Fulani regulated the movements of the Fulani and Twareg tribes into and out of the delta zone of the Niger River, by assigning an order in which the herds and flocks could re-enter the delta in the early dry season (Gallais 1967). Similarly, the Lozi king of northwestern Zimbabwe would decide the date when cattle and people would have to leave the flooded area for higher ground (Gluckman 1951:11). Among the Tallensi of northeastern Ghana, only the chief had the right to set fire to bushland because of the danger of accidents (Fortes 1940:259).

Three basic informal rules are common to all African pastoralists: avoid areas already in use, keep at an appropriate distance from others, and avoid areas just recently vacated by others. The Twareg and Fulani prefer areas that have no signs of trampling (Bourgeot 1981:171), which represents a longer rest period for the range than the practice of the Dinka of Abyei, who avoid areas with moderate to high amounts of cattle faeces (Niamir 1982). The Twareg also say that those with large herds must go further from the water point than those with small herds (Gallais 1975:75).

These social controls, both formal and informal, obviate the need for fences and act as checks to a 'tragedy of the commons' (Hardin 1968). These controls were enforceable through the traditional power of the leadership, the individual's need for conformity and acceptance, and the need for reciprocity and mutual help. Sharing common property meant that short term restraint and discipline had to be exerted in order to maintain the rangelands' long term sustainability. In the traditional system, there were some 'open access' lands, where the tragedy of the commons could theoretically occur, but these were

usually peripheral lands between tribal territories. These areas were infrequently used and acted as drought reserves, or were contested by the neighbouring tribes. Most rangelands were 'common land' - land controlled by a tribe, clan or other social unit. This social control and organisation of access to resources mitigated against a tragedy of the commons.

Some of these organisations, especially those relying on communal cooperation, are gradually disintegrating due to increasing resource scarcity and socio-political upheaval, such as imposition of centralised government structures, destruction of local political authorities, attractions of urban centres, and increasing income disparities.

Implications for Development

This survey and synthesis of existing literature shows that pastoral groups use a wide range of techniques in managing their natural resources. Their systems are neither random nor irrational, but quite deliberate and adapted to the vagaries of their environment. Many more techniques will probably be identified with the growth of interest in describing and using traditional systems for development. Most of the work so far has been done by social scientists who, because of their training, tend to concentrate on issues such as social control, land tenure and political organisation. More involvement by physical and biological scientists is needed to identify the technical repercussions of traditional rangeland management.

Some believe that these traditional systems have completely disintegrated and cannot be used for development purposes (see e.g. *Pastoral Development Network* Paper 29d). The survey upon which this paper is based solicited comments from many people currently active in the field, who are engaged in documenting or reviving traditional management systems. Although hopes of reviving and modifying some traditional systems must be abandoned, in most cases, there is room for improving upon the traditional system and developing techniques that are locally appropriate. This implies that there is a need for a synthetic approach that combines traditional and modern techniques (Richards 1975:110, Brokensha *et al.* 1980). Given the heterogeneity of both traditional and modern techniques and the particularism of local constraints, the process of combining traditional and modern techniques cannot be given in a 'blue print'. It can only be done if development projects are designed with more flexibility and with closer participation by the local people in all phases of development work: project identification, design, feasibility study, implementation and evaluation.

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