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PLANNING LIVESTOCK DEVELOPMENT: THEMES FROM INDIGENOUS SYSTEMS

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SUMMARY

The rangelands of the world are declining in productivity in spite of the introduction of programmes designed to modernise these traditional pastoral systems of livestock production. This paper suggests that, in designing the modern systems, planners have failed to appreciate the factors influencing success in the traditional systems and that disadvantages have resulted from the introduction of modern systems which reflect only 'western' conditions. The maintenance of animal mobility and the common use of range pastures, together with a proper appreciation of critical resources and feedback information in traditional systems, should be the constituents of plans to improve productivity.

INTRODUCTION

More than 35 % of the earth's surface is used for pasturing domestic animals. Most of this land is not conducive to cultivation. Thus the extensive grazing of ruminants is the best way to utilise them for the production of food and fibre.

The productive capacity of much of the world's pasturelands is declining. Presently, 19 % of the world's surface is threatened by encroaching deserts; most of this threatened land is rangeland used to support grazing animals.[1]

The deterioration of the world's rangelands coincides with increasing population and the need to expand food production. The productivity of rangelands is threatened throughout the world, but the situation appears most severe in Africa and in the Near East where pastoralism has been an important part of traditional food production systems. In these regions nomadic and transhumant pastoralists

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make important contributions to local and national economies and in some areas constitute a sizeable proportion of the population. The development of these nations logically includes the development of the livestock sector.

Over the past 35 years there have been scores of programmes designed to modernise pastoral livestock production systems. Virtually all of these have failed. So severe and widespread have been the failure of these programmes that in Africa the abandonment of all investment in pastoral development projects has been seriously discussed by international donors.[2] Given the importance of the traditional livestock sector to many African nations, it is doubtful that all efforts in this area will stop, but future investment in pastoral development will be closely scrutinised.

A major cause of failure was lack of appreciation by planners of those factors that are essential to the management of livestock enterprises in semi-arid and mountain rangelands. An examination of traditional systems of livestock production in the Americas, in Europe and in Africa can help us to understand what organisational features are essential to the design of successful livestock development programmes.

The elements that should be included in any programme of livestock improvement are: (a) mobility, (b) common or public ownership of extensive pastures, (c) regulations which centre on control of critical resources and (d) a feedback mechanism which permits people to assess range and forage quality. These themes are common to virtually all successful livestock systems using extensive pastures. These factors will be discussed in detail below but first it is necessary to review past attempts at pastoral development.

ATTEMPTS AT DEVELOPMENT

When compared with the ranches in North America and Australia, the productivity of the herds of traditional Third World pastoralists appears quite low. Losses to disease are high and lack of sufficient quantities of feed throughout the year results in slow growth and very low calving and lambing percentages. The annual off-take from herds in Africa and the Near East is also less than half of that of ranches in the developed world.[3-5] The apparent gap between the actual production of pastoral herds and their potential output has encouraged investment in pastoral development schemes. These efforts have provided for improved veterinary services, selective breeding programmes, market development and range management.

Proper range management is the key element in virtually all of these programmes. Seasonal shortages of nutritious pasture are the major constraints to animal productivity. Unless pastures can be used more productively, improved breeding stock will not increase production. Lack of forage will prevent improved stock from achieving its potential. Better veterinary service by itself will reduce mortality and result in overstocking, thus lowering animal productivity. Water point development can improve the diet of animals by permitting them to use previously inaccessible

pastures but no such interventions can be successful unless the movement of livestock can be regulated.

In order to control livestock movements attempts have been made to settle nomadic pastoralists or to assign pastoralists to particular grazing areas. Individual or group ranches have been the most common form of organisation. Programme planners felt that breaking up traditional forms of pastoral production was necessary in order to increase the production of meat and fibre and to protect the environment.

The failure of livestock development schemes in Africa and the Near East has been due largely to a failure to get pastoralists to adopt range management practices. Attempts to organise controlled grazing areas have been ignored or resisted by livestock producers. Often, livestock development efforts have resulted in more overgrazing. Generally livestock development projects have not produced significant improvements in animal productivity. Although there were a number of reasons for project failure, in general project planners underestimated the efficiency of existing production systems and failed to incorporate critical parts of local livestock production systems into their plans.[6] As a result, Asian and African pastoralists, like many of their homologues in North America and Australia, have not followed the advice of range management technicians.[7-9]

Until technicians develop (socially and economically rational) range management programmes compatible with local practices pastoral development schemes are doomed to failure. It is therefore necessary to examine traditional pastoral systems to determine which features are essential to rangeland production systems. These features must be included in any attempt to reorganise or to modernise pastoral development systems. An examination of pastoral production systems in Europe, Africa, Asia and the Americas reveals that four elements are crucial to the proper functioning of most extensive livestock production systems: mobility, public ownership of rangeland, regulation of critical resources and the existence of a feedback mechanism. Each of these elements and their importance for pastoral development will be discussed below.

Mobility

One of the characteristics of extensive animal production systems is the mobility of animals. Most rangeland is characterised by low and highly variable per hectare yields of forage. In general, a livestock producer dependent on semi-arid or alpine pastures must have access to several distinct ecological niches in order to properly feed his herds throughout a year. The movement of animals permits efficient use of available pastures and protects them from overgrazing.[10]

The amount of animal movement required for efficient animal production is a function of climate, soils and topography. Variable rainfall patterns and arid conditions increase the area required to safely support herds. The productivity of soils and the availability of water also influence mobility. In general, the more productive and reliable are the pastures of an area, the less important mobility is for

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animal production. Thus, in the valleys of Europe's Alps and America's Rockies where pastures are reliable, herds may only move a few kilometres during a year. In some parts of Africa, where pastures are less reliable, annual movements of 700 km are not unknown.

In general, in those parts of the world where nomadic or transhumant pastoralism is a traditional economic activity, the ranges have highly variable levels of production. In these regions periodic droughts occur frequently and even in 'normal' years rainstorms are unevenly distributed across the land. In parts of East Africa a herder needs access to more than 120,000 ha of land in order to cope with an unreliable environment even though, in any given year, his herds will use only a tiny percentage of this land.[11]

Pastoral development programmes generally attempt to severely restrict the movement of herds. Nomadism, transhumance and free access to pastures have been viewed as a major source of environmental degradation and a barrier to increased livestock production. Planners reason that if movement of herds is unrestricted, rangelands remain undeveloped as non-participating pastoralists may otherwise use forage being placed in reserve by project participants. If access to pastures cannot be regulated pastoral development programmes will often fail.

Designers of range development programmes have routinely attempted to restrict the mobility of pastoralists in order to control access to pastures. By doing so they have usually ignored the importance of pastoral mobility and thus doomed their programmes. For example, many group ranches in Kenya contained less than 30,000 ha. Individually owned ranches were much smaller.[12] In order to survive, ranch members had to graze their animals outside ranch boundaries for at least part of the year. To be able to do this, they felt obligated to permit non-group members to graze their animals on ranch lands in exchange.

Thus group ranches have generally failed as a mechanism for regulating grazing patterns. Group ranches and grazing co-operatives in Sudan, in Tanzania and elsewhere in Africa have experienced problems similar to those encountered in Kenya.

In retrospect the goal of reducing the mobility of pastoralists appears to be based more upon political considerations than purely technical ones. Many government officials feel that the mobility of pastoralists makes it difficult to provide them with government services and to govern them. For these reasons most nations with large pastoral populations are trying to sedentarise them. The inclusion of political and social goals in rangeland development projects has led to excessive restrictions of animal movement.

The results of the failure to allow pastoralists sufficient mobility are most dramatic in Africa and the Near East but can be noted elsewhere. In the New World early land distribution policies created ranches too small to permit sufficient movement of animals. These ranches have been economically unviable and are often overgrazed.[13]

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Public/common pasture

Another characteristic of most extensive livestock production systems is the existence of commonly or publicly owned pastures. In the traditional pastoral areas of Asia and Africa virtually all grazing areas are commonly held while in the developed world many seasonal pastures and low yielding lands are controlled by a national or local government agency. The existence of public or common pastures is widespread as a means to provide for mobility of herds. In areas where small family herds are common, the division of rangeland into small, individually held, ranches would, if implemented, reduce the overall productivity of livestock. Confined to these ranches, animals would not be able to utilise temporary surpluses of forage in a given locality and would be restricted to areas where temporary shortages of pasture occurred. Privatisation of pastures would result in the suboptimal use of pastures. The threat of overgrazing is potentially more severe on small ranches than on publicly owned lands.

Often, the privatisation of land ownership will constrain projects aimed at improving productivity of pastures.[13,14] Owners of small herds, for example, often lack the resources to develop water points or to fence range lands. Even if a pastoralist could borrow such money, the increased production from a small herd may not always pay for such investments. This is because the low productivity of many pastures makes the fencing of small areas economically impossible. Collective investments in rangelands can, however, increase productivity and prevent environmental degradation. The need for collective investment is not unique to Third World Nations. The US Government has encouraged the formation of grazing associations among small producers as the principal means of financing range improvements. We also find village ownership of mountain pastures to be a common occurrence in Western Europe; some of these systems have been communally managed for more than 600 years.[15]

In general, as the advantages of herd mobility increase, the more appropriate is the public or common ownership of pastures. Private ownership remains a viable means whereby individuals can acquire access to sufficient amounts of land to reduce ecological and economic risk. In those areas where traditional forms of pastoralism exist, the amount of land required even for a small herd is quite large. The creation of large viable privately owned ranches would require the displacement of large numbers of small livestock producers. These ranches could be operated by small crews of hired workers. Although it might be possible to create such enterprises, their development would have high political and social costs. Private and corporate ranching in Australia and the Americas was developed because of a lack of indigenous pastoralists.

In recent years Garrett Hardin's notion of the 'tragedy of the commons'[15] has become part of the conventional wisdom of agricultural planners.[16,17] Simply stated, the tragedy of the commons occurs when a group of people have the right to place as many animals as they wish on a common pasture. Under these conditions

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individuals will have an incentive to overuse and to destroy pasture resources because all benefits of overgrazing accrue to an individual while the costs of environmental degradation are shared by all members of a community. This existence of common pastures thus is seen as a major barrier to improved livestock production.

On the other hand, using this line of reasoning, privately owned pastures do not result in a conflict between individual and collective well-being and thus are viewed as the ideal form of land tenure. Where private ranches are not feasible for political or social reasons, planners try to approximate private ownership by creating as small management units as possible.

Although conventional wisdom suggests that overgrazing is a result of common ownership of pastures, this idea is not well supported by research findings. There are numerous examples of common pastures that are not overgrazed, and privately owned and managed ones that are seriously overgrazed.[13]

In addition to these empirical contradictions the 'tragedy of the commons' notion appears to be based upon questionable theoretical assumptions. Fife points out, for example, that in periods when animal products bring high prices, it may be quite rational for a private landowner to overgraze his land.[17] More important, however, is the fact that the 'tragedy of the commons' model can only apply under conditions where all herders using a common pasture are independent and where they do not interact or attempt to exert influence upon one another. Such behaviour is very unlikely among people who share a common resource and a similar culture. Runge points out, in a 1981 paper, that such behaviour is a basic assumption in the 'tragedy of the commons' model.[18]

A preference for privately owned pastures is based more on ideology than an understanding of pastoral ecology. The idea of the 'tragedy of the commons' has been an attractive one to planners because it places the blame for overgrazing on traditional land tenure systems. It also provided a 'technical' justification for reducing the mobility of pastoralists through the creation of relatively small ranches to be grazed only by the animals of their owners. As we saw above, attempts to reduce mobility of pastoral herds have often had disastrous results and met with stiff resistance from livestock producers.

Emphasis on sedentary livestock production and the use of the privately held ranch of Australia and North America as models for development has resulted in the inadequate design and failure of many development efforts. Failure to appreciate the importance of mobility for livestock producers and the strengths of traditional land tenure patterns has doomed many livestock programmes to failure. To make matters worse, many livestock development programmes also undermined traditional controls over pasture use.

Critical resources

Because of the need for herd mobility and the advantages of commonly held

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pasture, it is difficult to manage stock movements by assigning individuals exclusive rights to certain rangeland areas. In addition, it is difficult to adjudicate grazing rights because different groups may periodically use an area. Many boundaries are unimportant to pastoralists.

Enforcing grazing regulations is equally difficult. Even in those few nations, such as Morocco, where the state has actively attempted to adjudicate and to enforce tribal grazing rights, pastoralists are unwilling to accept government edicts.[20] Today, nearly 50 years after initial attempts to assign tribal grazing rights, conflicts over pastoral rights continue and the original allocations remain in question.

Many pastoral societies, however, have had institutions to control access to their pastures. In general these regulatory mechanisms did not concern themselves with the ownership of rangelands. Instead, the control of stocking patterns is the result of rules that govern the access of herds to resources that are more reliable than common pastures and adapted to the intensive use of individuals and small groups. These critical resources may be water, labour, perennial dry season pastures or winter feed supplies.

In most rangeland areas the availability of water is a major determinant of land use. Without access to permanent water a herd does not have access to pastures, particularly during the driest part of the year when feed for animals is in short supply. Because of this, many pastoral groups have arrangements to regulate the access of animals to water. For example, wells and some other permanent water sources may 'belong' to individuals or to small groups who may limit the access of outsiders to water.

Two examples of this would be the Tuaregs of Niger and the Borana of East Africa. In the Tuareg case families or small groups have rights to the wells around which their animals graze in the dry season. The Boran people use controls over access to wells as a means of regulating individual behaviour.[6]

For pastoral groups access to some other critical resource may determine stocking rates and patterns. In the Swiss Alps, for example, the requirement that one owns sufficient hay meadows within the village to feed all animals placed on the commons limits stocking rates. In some regions of Peru access to wet areas, called 'bofedales', where important dry season forage species grow, determines whether or not pastures are overgrazed. The carrying capacity of bofedales tends to be less than that of the surrounding common pastures. Bofedales are normally controlled by single families or small groups of families.[13] In the interior delta of the Niger there is an elaborate system called the 'dina' system which regulates access to the rich pastures which grow after the Niger's floodwaters recede. Groups without rights to these pastures are either excluded or they must pay grazing fees.[6] Similarly, the right to pasture animals in many public lands in North America was originally contingent upon the ownership of sufficient water rights or hay lands to support one's animals.

Failure to recognise the relationship between key pastoral resources and stocking rates is a major source of overgrazing and implementation of the livestock

development programmes. The case of water point development in Africa probably best illustrates the effects of this failure.

During the 1960's there were large programmes to develop water points as part of an overall pastoral development programme. These wells allowed herds to have access to pastures that had been previously under-utilised. Since these wells were in areas where pasture resources were not fully utilised and since they were built at public expense, access to them was not restricted. Government water point developments transformed what was previously a regulated resource into a commonly held one.[21] Rules governing access to locally constructed wells could no longer determine access to rangelands.

As a result of water source development programmes, non-pastoral investors and pastoralists from other areas were able to enter project areas and settle around permanent water points. Modern well developments have been particularly dangerous because they can provide water for more animals than the pastures around them can support. During droughts each water point becomes the centre of a small desert wherein hundreds or thousands of animals may die.

Many African pastoralists recognise the link between overgrazing and water point development. During the drought of 1968–1973 in Niger some Tuaregs requested that government sponsored wells be closed in order to protect their pastures. Elsewhere in Niger Fulani groups have opposed well development efforts for similar reasons.[2,6]

A closer examination of the problem of overgrazing and desertification in Africa reveals that mobility and common tenure are not the culprits. Instead, an important cause of overgrazing appears to be government policies which threaten resources critical to pastoral production. In addition to the water development policies outlined above, government agricultural policies favour the expansion of agriculture into those pastures normally used in the dry season, favouring the claims of farmers to land over those of pastoralists. This decreases the mobility of herds, confining them to ever smaller areas and thereby increasing the chances of overgrazing and vulnerability to drought.

Indigenous information systems

If people are to be participants in livestock development programmes, they must be able to see the benefits of improved management practices. Where producers cannot readily observe the relationship between management strategies and productivity, advantages of new production systems cannot be understood. For example, LeBaron *et al.*[22] argue that in parts of Bolivia overgrazing and erosion are not dealt with by local authorities because they are not perceived to be problems.[22] Even though Bolivian communities have the ability to regulate land use, lack of information concerning the cost of overgrazing to each community and the benefits of proper range management are not available to community leaders.

Without an ability to monitor programme results, we cannot expect herders to

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enthusiastically accept the word of non-local technicians. Furthermore, without such feedback mechanisms, technicians have no way of knowing whether their recommendations are feasible. In North America, where good record-keeping systems may exist, they often show that producers cannot afford to implement new pasture management ideas. Government subsidies are often required.

The ability to monitor the relationship between forage quality and availability and animal production is crucial. Pastoral groups who are able to do this practice some form of range management. This relationship is probably most evident in the case of milk production which responds quickly to changes in the availability of high quality feed. Swiss villages monitor milk production in order to determine stocking rates for high mountain pastures. Traditional pastoralists whose diets are based on dairy products, such as the Fulani, have a good knowledge of forage quality. Meat or wool production can also be monitored, though not as easily. Palacios-Rios[23] reports that Aymara herders monitor wool production in order to determine the stocking rate of alpaca on dry season pastures.

Government programmes in pastoral Africa which encourage beef production at the expense of dairy production may actually undermine the ability of producers to evaluate pastures.

Agro-pastoral production systems are a particularly difficult problem. It has often been pointed out that these communities experience much more severe overgrazing problems than do purely pastoral ones. This is particularly true where the livestock and agricultural parts of an enterprise are not linked by intensive forage production. In these cases livestock production is subordinated to crop production and is often seen as a source of savings or as a means of increasing labour productivity, rather than as an economic enterprise. Here maximising animal production is not a major concern, expecially when pastures are commonly held and essentially cost less. Livestock production fits around the edges of agricultural production and productivity is not monitored closely. It is in such areas where overgrazing is the greatest problem precisely because farmer-stockmen do not monitor livestock production as closely as do specialists in livestock husbandry.

CONCLUSIONS

The pervasive failure of pastoral development schemes has, in a large part, been due to the tendency of planners to ignore elements that are critical to the management of livestock on rangelands. The importance of mobility and commonly owned pastures for any extensive livestock production system was ignored or underestimated. This may be partially due to the fact that rainfall and pasture yields are much more reliable in the industrialised nations where most planners have been educated, than in most Third World regions. More than likely, politics and ideology have also played a very important rôle. Because Western nations are committed to

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private property, the basic premises of the 'tragedy of the commons' idea were not critically questioned until pastoral development schemes failed.

It was relatively easy for administrators to ignore the benefits of mobility because livestock production in the West was based on privately owned ranches. It was assumed that this form of organisation partially accounted for the high productivity of Australian and North American herds. The potential economic benefits of ranching were used to justify the political and social reasons for sedentarising nomadic peoples.

So strong has been this idea that, until recently, even professional range managers saw nomadism as a source of range deterioration rather than as a potentially valuable practice.[19] While there may be compelling social and political arguments for reducing the mobility of herds and herders, there are few technical ones. It is likely that in most areas the goals of reducing mobility and of increasing animal production are incompatible. As a result of this basic contradiction many projects have been doomed to failure.

In addition, there is a general failure to recognise the key elements in pastoral production systems. Because land tenure is so important in industrialised countries and in farming areas, it has been assumed that changes in land tenure arrangements are a prerequisite to pastoral development. Regulation of access to resources other than rangeland may be a more rational way to prevent overstocking. The development of proper water and information management systems may be much more crucial.

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