



People, Land and Livestock

*Proceedings of a Workshop on the
Socio-Economic Dimensions
of Livestock Production in the
Communal Lands of Zimbabwe*

Edited by
Ben Cousins

PEOPLE, LAND AND LIVESTOCK

**Proceedings of a Workshop on the Socio-economic
Dimensions of Livestock Production in the Communal Lands of
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Edited by Ben Cousins

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**HOUSEHOLDS, LINEAGE GROUPS AND ECOLOGICAL DYNAMICS
ISSUES FOR LIVESTOCK RESEARCH AND DEVELOPMENT
IN ZIMBABWE'S COMMUNAL LANDS**

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INTRODUCTION

This paper covers a broad range of issues relating to the socio-economic determinants of livestock production in Zimbabwe's Communal Lands (CLs). It is not comprehensive, but aims at picking up a number of important themes to develop the debate about CL livestock development. The central argument of this paper is that a fuller understanding of the CL livestock production system can only be gained when the interactions

between household economic objectives, ecological processes and lineage production organisation are studied in an integrated way.

We have tried to draw on the growing body of research being conducted in Zimbabwe's CLs at the same time as relating the Zimbabwean debate to wider discussions of African agropastoral economies. Our particular perspective derives from rural based research carried out in Zvishavane district over the last few years. The focus tends therefore to be on the dryland CL situation of the central south. More than half the CL population lives in the broad arc of CLs in the central south of the country, of which this area is broadly representative. However, we attempt to bring out regional perspectives on the issues discussed. This is not wholly satisfactory as little contemporary in-depth research information exists for the Zambezi Valley areas and Matabeleland.

The paper stresses the importance of understanding the economic basis of production systems in CLs. This relates to the objectives of livestock production for CL farmers, the patterns of land use and the potentials for grazing management. Livestock production is affected by economic factors at many levels. The rural household has been the major focus of study, but intra-household factors, socio-economic relations among lineage groups, relations between rural areas and the urban economy are also important. These different factors affect patterns of livestock accumulation, access to livestock for arable inputs and rural differentiation. A hierarchical view of production organisation needs to be developed that builds on household level studies to understanding socio-economic factors at other levels of organisation.

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A socio-economic perspective must interact with a dynamic ecological understanding of CL production systems that examines how socio-economic conditions determine how farmers manage their environment. The nature of environmental variability and patchiness also influences farmer decision-making and management strategies, for example in relation to the impact of drought.

An integrated view of economic, social and ecological processes suggests different research questions that need tackling, new methodological approaches that require development and alternative interpretations of technical and extension strategies. This paper introduces some of these arguments which will hopefully serve as a useful contribution to the debate about the socio-economic determinants of livestock production in Zimbabwe's CLs.

1. THE HOUSEHOLD AS THE FOCUS FOR STUDY

1.1 Understanding the different functions of livestock

The household has increasingly become the focus for study in farming systems. Farming systems research (FSR) approaches have encouraged this change in emphasis and have increased our understanding of the role of livestock in the farming system (e.g. Shumba 1984). By concentrating attention on objectives at the household level it is recognised that livestock have a wide range of functions within the household economy (Mombeshora et al. 1985). This analysis has taken our understanding of CL farming systems forward in recent years. However, the limitations of the "household" approach and the

importance of a hierarchical view of organisation are explored in later sections of this paper.

The Zimbabwean peasant farming system is one based primarily on the production of crops - with cattle playing an important role in providing inputs. It is an agropastoral economy with similarities with other systems in Africa (cf. Colson and Chana 1965; McCown et al. 1979; Kjaerby 1979; Brandstrom et al. 1979). The success of arable output is highly reliant on access to arable inputs of manure, draught and transport. This has been highlighted in a number of studies (eg. Theisen and Marasha 1974; Gobbins and Frankerd 1982; Collinson 1982; GFA 1987).

Donkeys are also critical to agricultural success - especially in the dry south of the country. Increasingly they are being used for draught. However, very little research work has been carried out on these animals.

Smallstock (goats and sheep) have a slightly different role to play. Although their manure is highly valued, especially for gardening, they are most important in the local economy through mobilising cash for school fees and other expenditures and in the provision of meat. Goat populations have a very high turnover - they contribute to a production system for cash and slaughter. Fast growth rates mean that rapid restocking after drought is possible. Their small unit size means that sale by poorer stockowners is possible without disposing of a large percentage of stock assets. Pigs also play an important role in some areas.

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The contrast between large and smallstock is clear. In terms of household objectives cattle and donkeys are kept primarily for arable inputs and smallstock for cash and meat. This understanding conflicts with many researchers' views from the colonial era. A poor understanding of the household production system led some to interpret the keeping of stock as part of a "cattle complex" (Bullock 1950), where animals were kept for prestige and status rather than for productive value. This led policy to be directed at ridding African farmers of the "complex" and inculcating them with the objective of the beef rancher.

More sympathetic research has enlightened views considerably since then. The cattle complex notion is no longer considered credible (Steele 1981; Mtetwa 1978) and a greater understanding of livestock functions has been reached. This is gradually being reflected in policy. The Chavunduka report (Zimbabwe 1984) notes that "cattle are not primarily raised for meat, but as a way of capital savings and as an important source of draught power and manure" (para. 195). However the logic of this new understanding is not always seen through. The report continues: "the communal herd with its present low offtake has a large potential to supply beef". Some of the following arguments will illustrate why this is unfounded.

1.2 A shortage of cattle for arable inputs

Various studies have tried to assess cattle holdings in CLs. The estimation of levels of ownership is complicated by loaning and sharing relationships which are an important feature of the lineage production system (see section 6). However what all studies show is that stock access correlates closely with

arable production and in most CLs there is an overall shortage of draught animals.

Collinson (1982) showed that in 1981 only 28 percent of households "owned" 4 or more cattle in Chivi. Similarly the Central Statistics Office survey showed that nationally 70 percent of households own less than 6 (Zimbabwe. Central Statistics Office 1986). GFA (1987) found 40-60 percent of households holding less than 4 animals. Shumba (1984) found the average holding in Mangwende and Chivi to range between 2.6 and 3.3. Mombeshora et al (1985), however, found the range to be 5.5 and 9 in a later survey. The distribution of ownership is highly skewed with a large percentage of all animals being held in a few small herds.

GFA (1987: 84) found that "with increasing herd size total production [of maize] rises continuously to reach nearly four times the production of households without cattle. Since cattle are so crucial to arable production it is important therefore to understand how households without sufficient draught ensure access. This issue is treated in sections 6 and 7.

1.3 The household objective for livestock production must determine productivity measures

The household objective for livestock production should determine the measures appropriate for estimating the productivity of communal area livestock. A number of studies of pastoral systems have illustrated the relatively high levels of productivity of traditional pastoral systems. Comparing the Borana pastoral system of Ethiopia and Kenya and Australian ranches, Cossins (1985) found that the Borana system produced

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more protein and energy per unit area at a lower cost. De Ridder and Wagenaar (1986) found similar results in comparing traditional and ranching systems in Botswana.

The full value of CL cattle has to incorporate valuations of their multiple functions. If a fuller understanding of the economics of CL livestock production is to be gained, methods for valuing subsistence roles need to be evolved. Behnke (1986) provides an instructive insight into how this may be achieved. He argues that there is a need in livestock FSR to "bring technical measurement criteria into line with the criteria farmers and herders use in reaching decisions."

It is important to establish the appropriate unit(s) of measurement for valuation. This is a problem particularly for subsistence production. Different studies have used energy equivalents, protein equivalents, market valuation (local or formal) and replacement cost measures where the cost of substituting an alternative is taken as the measure. The following section is a discussion of the problem of choosing appropriate measures for CL cattle valuation.

2. THE ECONOMIC VALUE OF CL CATTLE: UNDERSTANDING FARMER STRATEGIES AND EFFECTIVE LAND USE PLANNING

Assessing the productivity of the CL production system using measures that are appropriate is important for two reasons. First, understanding the role of different components of the farming system, according to criteria used by farmers, will help extensionists and policy makers to understand why farmers make particular decisions (eg. not selling cattle). With this

understanding, policy and extension can become more focused on farmer priorities. A second use is in relation to decisions about land use planning. The relative productivity of different production systems should form the basis for deciding on the allocation of land to different uses. In this context the debate over wildlife utilisation in the CLs is discussed.

2.1 Components of economic value

The various components that must be considered in establishing the economic value of CL cattle are outlined below. The methodological problems of assessing subsistence output have not been resolved; a number of methods have been used in the preliminary studies that have tackled this issue. Evolving appropriate methodologies is an important challenge. This section tackles two questions: how valuable are cattle and how do we find out?

- * Draught can be valued in terms of the output of crops. Clearly this is going to vary between years and between regions. The opportunity cost of not having draught to plough is high. The alternative of land preparation by hand is laborious and likely to result in lower yields. The issue of timeliness of ploughing is also significant. An economic assessment would have to assess the alternatives of hiring draught teams or tractors.

- * Manure can be valued in terms of its fertilising ability. The value of manure again will be dependent on the site. On clay rich soils without water its beneficial value may be minimal, but on the poor sandy soils of most CLs the importance of manure application is well recognised (Grant

1981). The quality of CL cattle manure may be quite poor (Mugwira 1984) but its fertilising properties combine with important soil structure improvement qualities. The actual value of manure is therefore difficult to assess, but an indicator can be given in terms of its fertiliser equivalent.

* Milk yields in communal area cattle are generally low. Potential human availability may be in the order of 0,5 - 1 litre/day (GFA 1987, p83). Other studies have found milk offtake levels to be higher (Henson et al. 1983 and our own observations in Zvishavane District). This is of course seasonally dependent. Calving rates in the CLs are around 60 percent (GFA 1987) so that perhaps only c 1/4 of cows are milking at any one time. However, at high stocking rates the amount of milk produced per unit *area may be quite high. Certainly, seasonally, milk is an important nutritional source. It tends not to enter the formal market, partly because of legal restrictions and partly because the unit amount per household herd (say 1-2 cows) is small and intermittent. Organising sale is not worthwhile on any significant scale. However, wet season local sales of fresh or soured milk are important in some areas. The overall value of milk can be estimated, accounting for these factors, in terms of the market price for the product.

* Transport is often forgotten as a function of cattle, but their role in the pulling of carts, dragging brushwood etc is important. This is reflected in the high price of the hiring of animals for such purposes. This partly relates to the scarcity value of carts, but it is important not to underestimate the value of the transport function and

recognise that cattle have an economic role outside the farming season.

* Beef has a market price set by the Cold Storage Commission. This has risen significantly in recent years. Beef offtake in most CLs is low. GFA (1987, p54) found it ranged from 1,3 percent to 3,7 percent in the survey areas. This low rate has been evident since the 1950s in most CLs. Due to the destocking policy of the colonial government the cattle holdings per household were reduced to levels where they represented only subsistence (arable input) herds; offtake therefore dropped. Today (GFA 1987, p78) offtake only becomes significant when herd sizes grow beyond the 5-8 size (or 9 - 12 size in region V). Sales generally represent the disposal of old animals, sales for emergency raising of cash (eg for school fees) or sales to raise bridewealth money. Only in certain areas of Matabeleland do sales rise to a significant percentage (15-20 percent). The market price of beef can serve as a valuation of this output.

Herd increase has also to be include in the valuation of a herd. Any change in the asset value of the herd through birth/purchase less death/sale can be assessed by valuation of the increase/decrease according to the market value of beef. However this probably underestimates the true value of cattle over their lifetime.

Costs of production in the CL system are low. These may consist of herding labour if hired and veterinary expenses incurred by the state for dipping and extension work. There may also be environmental costs of the CL production system. Consideration of these will be left until section 4.

2.2 Preliminary estimations of economic value

There have only been a few preliminary attempts at estimating the economic value of CL cattle. The first was by Danckwerts (1974) who examined the economics of cattle production on 16 grazing schemes in Masvingo province. Three more recent studies by Agricultural and Rural Development Authority (1987) using a hypothetical model for Matabeleland CLs, GFA (1987) in a study in Natural regions II to V, and Scoones (1987) in a preliminary discussion of data from Mazvihwa CL have attempted similar valuations. The assumptions used for valuing production were different in each case, but the general theme emerged that the value of communal area cattle for arable inputs outweighs other functions. This is illustrated in the table below.

Table 1: Valuations of production: inputs to arable and production outputs

Study	Percentage of total (%)					
	Draught	Manure	Milk	Sales	Slaughter	Work
Danckwerts	41.7	7.6	28.6	17.6	4.5	na
GFA	38.7	9.8	40.9	10.5	na	na
ARDA Zone IV	48.2	18.8	5.8	27.2	na	na
Zone V	36.7	32.1	7.0	33.2	na	na
Scoones	29.5	2.7	38.3	11.5	na	18.0

Unfortunately there have been no comparable studies done on the economics of donkeys and smallstock in the Cs. Before any judgment on the full value of the use of communal rangelands can be made these studies will have to be done. This is necessary before a full assessment of the different productivities of alternative production systems can be made. The use of the economics of CL production studies in relation to the debate over wildlife utilisation in CLs is illustrated in the next section.

2.3 Comparative economics: cattle and game

There has been experimentation with game ranching in Zimbabwe for many years (Dasmann et al. 1965). The ecological impact of game as a mixed system is argued to be less than if cattle are run on a ranch alone (Taylor and Walker 1978) The comparative economics of ranching with game as against cattle seem to be stacked against cattle, especially if meat production can be combined with hunting and safari operations (Child 1988).

There has been recent interest in the possibility of incorporating game ranching into the CL production system under the CAMPFIRE programme (Nyamapfene 1986). There are two possible scenarios under which game are managed in a CL context. One is where CLs are adjacent to National Parks and the natural spillover is culled in a sustainable manner. The financial benefits then accrue to the local District Council. The other option, as yet untried, involves the introduction of game into areas away from National Parks and the management of them with cattle in controlled grazing systems.

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The former option is operational in some parts of the country and really does not mean that the CL production systems is fundamentally affected. Instead the local council benefits from the game that were once a problem and were "poached", rather than under the new system "culled". Income is thus supplementary and welcomed.

The argument for reincorporating game into other CLs is not the same as that between ranching game, cattle or a mix. If it is assumed that most communal area grazing lands are stocked close to the "ecological carrying capacity", the addition of game to the system would necessitate the removal of other stock if greater areas of land were not given over to the CL producers. As discussed in section 1.2 there is a current shortage of available draught power which is impairing agricultural production. As game are not a substitute for cattle in terms of the CL production system (i.e. they cannot provide draught or kraal manure) the effective substitution of game for cattle or other domestic stock would not make sense. The value of game as meat cannot be expected to match the value of cattle as an arable input, even if the game outstrip the domestic livestock in the value of meat production.

The Agricultural and Rural Development Authority (ARDA) (1987) have compared the economics of communal farming as against wildlife management for Natural regions IV and V. Communal farming comes out the most economic land use in terms of economic output (\$/ha) in Natural region IV and second to a hypothetical case of mixed trophy hunting and game cropping in Region V conditions. This case relied on the assumption of the availability of big game (e.g. elephant, buffalo) which in most CL situations would not be desirable, either in terms

of veterinary regulations or risk to people. CL farming's estimated output in Region V exceeded trophy hunting and game hunting activities without continued farming. The CL model was based on recommended stocking rate figures of 8 ha/LU in Region IV and 15 ha/LU in Region V. If actual stocking rates are used (3 or more times higher) then the real economic benefits of the high-use agropastoral CL system are revealed.

Even if more land is made available for a wildlife operation, the question of management arises. Running the operation on a group basis presents some problems - who "owns" the animals, who receives the revenue, who is responsible for culling? These are some of the issues currently being faced by the CAMPFIRE programme. When considering reincorporating game into CL systems it is worth considering why game populations are low in these areas. Settler hunting and government destruction of game as vermin and for tsetse control has been significant in some areas. However, game has been largely hunted out by local people. In some places early taxes were paid in skins. The main reason for their demise has been to control them as crop pests, to harvest them for meat and for sport hunting. Hunting is highly valued and the economic benefits of not hunting out game will have to be significant to favour conservation. Similarly, the institutions of social control to police the rules will have to have considerable weight.

3. FARMER STRATEGIES AND THE ENVIRONMENT

3.1 The economics of CL production determine stocking levels

Stocking at high levels in the CLs makes economic sense. The economic carrying capacity of a system is determined by producer objectives. In beef ranching this is determined by maximising productivity per beast in terms of meat output. In contrast, in the CLs producers want to maximise the available animals for manure and draught per unit area. The levels of stocking are determined by these economic objectives. Thus economic carrying capacity is different to the ecological carrying capacity (Caughley 1983). Ecological carrying capacity is variable and determined by the environment. In beef ranching systems the economic stocking level is well below ecological carrying capacity, but in the CL system stocking rates tend towards this level. In a high use system of this type the effect of high stocking rates on long term ecological sustainability remains poorly understood.

Decades of research have been required to determine optimal stocking rates for meat production per animal under ranching. CL objectives are much more complex and the trade-offs between declines in manure and draught productivity with declining feed intake at higher stocking rates are not known. In order to recommend CL stocking rates suited to local economic objectives considerable applied research will be necessary.

3.2 Opportunistic stocking strategies are a rational response to a variable environment

The ecological carrying capacity is not fixed, particularly in variable semi-arid environments. As rainfall is so variable a stocking rate has to be very conservative indeed to avoid loss during poor years. The cost of this is that much herbage remains unharvested in the remaining years. Thus farmers have to accept a trade-off between productivity and risk. Their land shortage and poverty mean that they accept greater risk in return for higher stocking levels. In reality high stock deaths have been rare in CLs until the recent droughts. Farmers have accepted the risk of poor growth rate and condition in cattle because they are not aiming at producing meat but rather at maintaining biomass for arable inputs.

Farmers' long term survival strategy is, however, responsive to the risk implications of recurring droughts. Maintaining a large and mixed species stock holding reduces the risk of destitution. The theoretical consequences of this have been explored for some pastoral systems, (Wilson et al. 1986; Mace 1988), but have yet to be investigated for an agropastoral situation. Although there appears to be a cycle of wet and dry years in southern Africa (Tyson 1978), the occurrence of a drought cannot be predicted with accuracy. However as there is a correlation between rainfall in consecutive years due to this cycle, the number of stock that can survive any given year is a better than random predictor for the number that will come through the next season. Stock owners must then follow an opportunistic stocking strategy responding to the variable environment through movement or sale (Sandford 1982).

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Goat populations apparently fluctuate in response to environmental variability. The household objective of selling goats to meet immediate needs is reinforced in drought when crop or local wage labour income is reduced. Combined with natural mortalities, reduced birth rates, sales and increased slaughters decrease or stabilise the population. Due to high growth rates, goat populations rapidly recover after a drought. The ability to track environmental fluctuations in this way is being hampered by the lack of any effective marketing system for smallstock in the CLs.

On the other hand, an extensive marketing network of CSC sales exists for cattle, but these markets are under-used even in drought. The preceding discussion offers an explanation. Farmers cannot risk selling off valuable assets if there is a chance of them surviving the drought. The opportunistic response occurs through adaptive movement or loaning. Restocking of cattle populations is a serious difficulty generally requiring the purchase of less useful and more expensive grade animals from commercial farmers often at some distance. The high price means that outright purchase or exchange with goats (currently a ratio of about 1:10) is not feasible within CLs. The apparent non-credit worthiness of CL farmers means government loaning schemes are generally not available.

A major issue for CL livestock development is to enhance the opportunistic strategies of CL stock owners - through appropriate pricing measures, the establishment of small stock marketing, the facilitation of cattle movement to alternative grazing areas, the encouragement of loaning arrangements and

the improvement of restocking possibilities. Unfortunately, few of these are high on the policy agenda.

3.3 Interannual variability: livestock and coping with drought

CL production strategies are influenced by the interannual variability of the environment. Rainfall levels vary hugely, especially in the semi-arid regions of the country, where the coefficient of variation may be more than 35 percent. In the dry areas production is orientated around opportunistic accumulation and storage for dry phases. Food security is ensured through storage of grains produced in good years and through accumulation of stock from sales and exchange during good harvests. Those with very large grain stores may also be able to sell or exchange grain for stock during drought. Remittance income represents a high proportion of rural household income in all CLs (Jackson et al. 1987). Having access to this is important for coping with interannual variability and accumulating rural assets such as cattle.

It is therefore vital to consider the patterns of interannual variability when trying to understand farmer strategies or propose development interventions. In various ways this variability determines farmers opportunistic responses to ensure livelihood security. The importance of storage (of grain and livestock assets) and of movement to drought forage reserves needs to be more fully understood in this context.

3.4 Livestock use environmental patches at both macro- and micro scales

The inherent patchiness of the environment is another factor affecting farmer strategies to livestock production. Patchiness occurs at different scales: at the macro-scale there are differences between clay veld savanna and sand veld savanna and at the micro-scales between topland grazing and "key resources" (Scoones 1987; 1988b).

The differences between clay and sand veld savannas has long been recognised by livestock owners in southern Africa. It is the basis for the distinction between sweet and sour veld. Transhumant systems in Matabeleland are based on this distinction (Prescott 1961) Similarly, drought movements organised by DCs in the colonial period involved moving cattle off low veld areas (e.g. in Gwanda) in times of severe drought. Archival records and oral histories indicate that there was much movement between ecological zones in the past. Cattle were moved to ensure grazing, but more importantly, to secure exchange with grain. Today, the possibilities of drought movements are restricted, in part by EEC veterinary regulations. But in the 1982/3 drought and the 1987 drought, many movements off the clay veld onto the sand veld occurred.

The distinction between these two ecological zones is important in understanding the different dynamics of production systems. These are only just beginning to be understood in the CL context. Different soil properties determine the dynamics of the two ecosystem types. On clay veld plant available water is limiting and primary production is highly correlated with rainfall incidence. On sand veld nutrients are often limiting

the clay veld savanna the forage quality of grassland is higher. In good years clay veld grasslands are productive and of high quality. This resource may attract sand veld grazers. In the past the movement of cattle has been used as a strategy for fattening. However, in droughts the production collapses and movement to sand veld areas is required where production is more stable.

Patchiness at the micro-scale means that rangeland resources are not uniform in abundance and quality. "Key resources", such as vleis, river banks, drainage sinks, etc., exist that provide fodder at critical times of the year. In the higher use systems of the CLs these are the critical determinants of ecological carrying capacity.

The existence of patchiness influences the use of resources and should inform land use planning decisions. The adaptive use of a patchy environment is central to allowing leeway for farmers' opportunistic livestock strategies (cf. Homewood and Lewis 1987). Drought induced movements at the macroscale and herding patterns at the microscale are critical components. Policies that act to reduce this tendency such as land allocation, movement restriction or types of grazing area enclosure may have serious consequences for the sustainability of the system. Some of these issues are discussed further below.

3.5 Land use planning needs to be responsive to the management objectives of farmers and local ecological pattern

Land use planning needs to be responsive to the management objectives of farmers and local ecological pattern. Often conventional methodologies fail to take these fully into account. Technical decisions about the land capabilities of different land units or classes are often taken without reference to local management objectives and an understanding of the dynamic role patches play in the production system (cf. FAO 1974). It is impossible to plan a CL as if it were a commercial ranch; resources are used in very different ways because of the differences in production objectives.

In Zimbabwe land use planning takes place using aerial photograph interpretation and the definition of land classes according to soil type and some simple topographic rules. Since the early centralisation work by Alvord in the late 1920s the broad pattern of land use planning has been to allocate broken hill areas to grazing and then partition the remaining land until about half is arable and half grazing. Arable is allocated to the crests of rolling country, though we do not know the reasons for this. Grazing is thus found on the mid and lower catenal slopes. However the narrow bands of key wetland resources so crucial to sustaining grazing are not considered explicitly in the planning exercise. This reflects the lack of realisation of their importance in semi-arid environments. They tend to be allocated neither to grazing nor to arable, but the farmers themselves put much effort into both cultivating and grazing them. This tends to lead to conflict with the authorities. One of the contradictions within land use planning

in Zimbabwe is the commitment both to matching natural resource patterns of resource endowment to use, whilst at the same time insisting on allocating land in large blocks and imposing regular patterns. In a heterogeneous environment that is used in an opportunistic way dependent on season, it is difficult to impose grids, blocks or linear patterns. This is not a new argument in Zimbabwe. For example it recurs throughout the NRB Native Enquiry in 1942, where there were many criticisms of central planning being inappropriate to local circumstances. Land use planning decisions need to be responsive to local management objectives and patchy environments.

This is particularly important in the planning of grazing schemes. Unless notice is taken of the use of environmental patches by allowing for the use of "key resource" areas and the movement between areas in times of drought then the scheme cannot work as a functional unit. For instance, Galaty (1984) describes the problems of lack of consideration of resource use patterns in the context of group ranch schemes in Kenya. Consideration of these factors need to be central to the location of scheme boundaries and paddock delineation. Understanding farmer managed resource use is the first step in effective planning, along with consideration of the units of management in CL common grazing land (see section 9). The involvement of farmers in the primary planning of grazing schemes has been limited to date. In schemes we have visited we have often found that stock spend much time grazing outside of the formal paddocks on key resources such as drainage lines which were not incorporated in the design. In their survey of common property management in Zimbabwe, Abel and Blaikie (1988: 118) admit that the cattle had moved outside the paddocks because of drought conditions. Magonya (1982) did not find

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cattle within the Inyati scheme as many had been moved to grazing in nearby ranches.

The consequences of not involving farmers in resource use planning has been noted before. Floyd (1959), an enthusiastic implementor of the Native Land Husbandry Act (NLHA) comments on the arbitrary nature of land use planning decisions which he felt could have been improved upon by involving local people:

It is doubtful whether the surveyors tapped the fund of native knowledge concerning vegetational and soil associations built up over the centuries of close relationship to the physical environment. (p. 108)

One could only wish that more attention and a greater respect had been paid to the wealth of native knowledge concerning the limitations of their tribal country. (p.325).

Methodologies being experimented with elsewhere (e.g. agroecosystem zoning; IIED 1988) attempt to overcome these problems of conventional land evaluation. Such techniques are particularly well advanced in Asia. Farmers are involved in defining zones, establishing local classifications and identifying key resources. This can then inform land use planning using soil surveys, aerial photograph interpretations and surveying.

This section has illustrated how important it is to take a dynamic view of CL production systems. Farmers are reliant on variable and patchy ecosystems. Farmers recognise this and have evolved strategies accordingly. However, range scientists, agricultural economists, farming system researchers and animal production specialists often take a very static view. This arises because longitudinal data is hard to obtain and research

stations are poor replicas of complex reality. Understanding the dynamics of economic and ecological systems is difficult. It requires new approaches to production systems research where risk, variability and patchiness can be incorporated. Farmers understanding of historical processes and the rationales for local patterns of use and resource classifications can assist in this process. Complementary modelling approaches also can offer insight into the dynamics and risk implications of livestock development strategies.

4. ENVIRONMENTAL DEGRADATION: ECONOMIC AND ECOLOGICAL ISSUES

4.1 Arguments about degradation and sustainability are as much about economic issues as they are about ecological processes

Sandford (1982) concluded that there is no definitive proof of irreversible losses of productivity in the CL livestock production system. This remains true. Unfortunately, the statement has been misconstrued to mean that there is no environmental degradation in the CLs. Everyone knows that this is not the case. The important point is that we lack effective evidence of environmental trends. Unravelling the confused web of causal interactions over a long period when drought and rainfall cycles interact with stocking levels is perhaps an impossible task. We urgently need a dynamic and disaggregated view of degradation processes that can successfully inform management decisions. Predictions of imminent calamity based on one-off surveys (eg. Cleghorn 1965) serve little purpose in

this debate. The following sections attempt to point towards some possible directions forward.

Arguments about degradation and sustainability are as much about economic objectives as they are about ecological processes (Blaikie and Brookfield 1987). We need first to know what is the preferred state for a particular form of production before we can establish what degradation is. If we are concerned about a national park the diversity of animals and plants may be important to attract tourists and to conserve biological diversity or rare species. On a commercial ranch with seasonal feed supplementation a rangeland that maximises beef production is optimal (usually low tree cover, maximum grass cover, etc). In CLs, rangeland that can maintain high livestock biomass is the desired state (see section 3.1). This means ensuring the availability of key resources, the possibility of inter-zone movement and the provision of browse and other drought/dry season reserve fodder sources.

4.2 Measures and indicators of degradation

With the starting point defined by economic objectives, the measures that will define degradation can be sought. In a national park decreased biological diversity or extinction of rare species may be the indicators of degradation. In a ranch increased bush, decreased perennials etc are the indicators used to indicate that decreased beef production per unit area will follow in the long term (Barnes 1979). These indicators are of limited use in CLs. We need to disaggregate and discover what indicators are appropriate.

The question to ask for the CL situation is: what are the factors that, in the long run, will decrease the productivity of the CL production system? As already illustrated the crucial objective is to keep as many cattle alive for ploughing and manure as possible, combined with maximised smallstock meat production. This means ensuring survival in the long term, during droughts.

Identifying key ecological processes and resources: What are the critical ecological processes and the key physical resources that will ensure this? This will depend on the type of ecosystem. The distinction between clay and sand veld savanna is again useful.

The key constraint in sand veld is often nutrient availability, hence processes of nutrient cycling in the system should be of major concern. Nutrient cycling in savanna ecosystems is beginning to be understood (eg. Frost 1985), but in CL systems our understanding is limited. An area of concern for studies of degradation in sand veld CLs is the transport of organic material ingested as plant matter and transferred as manure from the grazing areas to the arable block (Floyd 1959:303-4; Theisen and Marasha 1974:47; Swift et al. 1987). In clay veld savannas the critical constraint is plant water availability. Reduced infiltration through capping and compaction should be the major concern here (McDonald 1978). The key physical resources that should act as indicators will therefore depend on our understanding of the system's dynamics, critical constraints and management objectives.

The lack of standing grass biomass, by itself, should not be an indicator of degradation. If it has been eaten then it has

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been productively used. It is important to realise that biomass does not equate with productivity. A closely cropped grassland is generally more productive than tall moribund stands (McNaughton 1985). The presence of trees in grazing land too should not be used as an indicator of rangeland degradation. This may act to enrich the soil and provide environments for nutritious fodder (Kennard & Walker 1973). Trees are also vital in providing a browse resource for cattle, donkeys and smallstock. In a high- use system, where the majority of grass is consumed, this is crucial. Similarly, a change in grass species is a poor indicator of degradation as this is often caused by climatic and other factors and may be beneficial in providing more nutritious fodder.

Soil loss from the topland grazing areas is obviously a cause for concern, but empirical studies which document the extent and pattern of loss and its effects on plant productivity are not available. Loss of soil at the field level (estimated by such techniques as SLEMSA) may be of a different order of magnitude to loss of soil at the catchment scale (Stocking 1987) as much soil tends to be redeposited again. Degradation of toplands can sometimes lead to compensating accumulations of soil and water in bottom lands. It is important to specify the spatial scale at which we are concerned about degradation.

The "key resources" that have been identified as critical to livestock survival - vleis, river banks, drainage sinks and the browse resource, are the components of the system that should be considered in investigating degradation. These are the indicators used by farmers. They are worried if gullies develop in vleis or key browse species are disappearing. These are the components of the system around which local management

of natural resources occurs or can be organised. For instance, the Zvishavane Water Resources project is involved in researching and organising with farmers the development and conservation of vleis. The ENDA-Zimbabwe Community Management of Woodland Project is involved in the local planning of woodland management and planting with VIDCOs. Many of the plans produced by the farmers include the proposed improvement of the browse resource.

4.3 The economics of environmental degradation

The physical and ecological components or a better understanding of degradation in CLs have been considered. It is now time to turn to the economic dimension. Planners like to have "\$" attached to statements about degradation - what are the costs of environmental damage? The economics of sustainable development is poorly developed (Barbier 1987). If future generations are not to suffer the consequences of current environmental degradation then the cost of future degradation must be discounted to the present to ensure "intergenerational equity". In project planning the discount factor used is generally the social discount rate, although it is rather arbitrary (Markandya and Pearce 1987).

The long term impact on CL livestock production of continued soil losses can be assessed in an economic context to give some perspective to purely "conservation" arguments. Biot (1988) has estimated that the useful life time of a soil being eroded under conditions of intensive use on rangeland in Botswana is in the order of several hundred years. The costs of conserving this soil and extending its life beyond this are heavy. A simple model estimates that a 5 percent reduction in soil loss

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can only be achieved with a 49 percent level of destocking (Abel and Blaikie 1988:127). This obviously would not be economic. Our ability to make land use plans operative over centuries is constrained by the knowledge that rapid changes in population, technology and economics will most certainly intercede. The soil under "traditional farming systems" will last much longer than the oil used as the basis for commercial farming systems!

A concentration on "key resources" may be a better way forward. Key components of the system can be assigned particular "option values" (Seckler 1987) that can be costed into any assessment. The option value of a vlei would rate higher than that of the upland grazing and the economic loss of soil from the two areas would be judged accordingly.

The problem with the economic valuation of degradation processes is that it requires a lot of data that is unavailable - relative importance of different components of the system, rates of degradation, presence of discontinuities etc etc. Such costing exercises also presuppose that a benevolent planner will make the "right" decision.

Discounting the future may happen automatically if communities are given the opportunity to take "the long term view" through security of tenure and community involvement in decision making and local planning (Chambers 1987). The understanding of the system from a farmer's perspective also allows the identification of key resources and processes that can be the focus for management and conservation support.

5. DESIGNING INTERVENTIONS ON THE BASIS OF SOCIO-ECONOMIC UNDERSTANDING

Zimbabwe has a tradition of high quality technical agricultural research within the Department of Research and Specialist Services, the University and other research institutions. Since Independence the focus of the research has shifted towards supporting CL production. Through the work of the Farming Systems Research Unit and others it has become increasingly realised that technical issues must be seen in the context of the socio-economic circumstances of the CL producers. (sections 1 and 2).

This section examines briefly a number of technical interventions proposed for livestock production improvement and illustrates how an understanding of the role of livestock in the farming system can inform technical research and design. It is shown how socio-economic research is necessary because technical options derived from the "beef paradigm" are often inappropriate.

5.1 Prices and marketing: implications for CL producers

Agricultural economists have investigated the supply response of peasant livestock producers in southern Africa. They have found a negative supply response in Swaziland (Doran, Low and Kemp 1979) and in Zimbabwe (Rodriguez 1985). It is suggested that this is a rational economic response because herd owners want to build up their inventory of livestock so as to sell off later at the higher price (Low 1980). The negative price response is seen in both communal and commercial cattle sectors in Zimbabwe. However, as we have seen, the economic objectives

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of the communal cattle owner are very different to the commercial beef rancher. For a stock poor CL farmer a higher price means that the standing asset of cattle is raised and there is greater incentive to hold on to it for its productive benefits as replacement becomes more costly. This is a different explanation to the inventory build up of commercial producers. It suggests that in the long-run too, the price response will be negative. Sales only occur when there are sufficient cattle to meet local needs. The conditions under which commercialisation through sales can occur are discussed in section 7.4.

The high price of beef is aimed at boosting supply to satisfy urban demand and fulfilling the EEC export quota under the Lome agreement. This is an important foreign exchange earning representing a significant proportion of exports. However, the CL farming sector is not responsive to these price incentives and the beef derives largely from the large scale farming sector whose supply response, in the long run, is positive. High prices mean that the cost of acquiring cattle for arable inputs is increased. In terms of the ability to recover after the cattle population crash of 1982/3 the price levels have constrained many farmers in their options for restocking thus negatively affecting agricultural outputs. Thus high cattle prices are far from welcome to CL farmers, as these are costs of capital acquisition, rather than revenues from sales.

Raikes (1987) examines another implication of the EEC incentives. He notes that "much of the beef is produced on land... which has better rainfall and soils than that on which many of Zimbabwe's peasants have to make a living." He goes on to suggest that "economic planners and advisors, concerned with

foreign exchange are less motivated to acquire land for resettlement than to promote beef production for export at high prices". The tension is clear between the recognised need for resettlement and the need for foreign exchange for development. The increases in marketed crop output from CLs in response of CL farmers to the price, input package and credit incentives for maize production after Independence are internationally known (e.g. Harrison 1987). The success of increased grain output through price and marketing support cannot be realised at the same time as increasing CL beef output. This is because the increased levels of grain output are heavily reliant on inputs derived from cattle. If prices of these inputs are raised and their availability reduced then grain output levels can only suffer. It is impossible under current conditions of land shortage in the CLs to have it both ways.

There remains, however, the largely untapped potential for encouraging small stock marketing. Small stock are produced for meat and are regularly sold. Many children attending rural secondary schools are doing so as the result of goat sales. However, in many areas local markets are saturated: there is insufficient liquid cash for regular purchases. At the same time the urban market remains unsatisfied. The success of the informal goat markets near Harare are witness to this. The potential has been recognised for many years (Cross 1974), but has not been exploited. The opportunity for export sales to the Middle East is also opening up. CSC are slowly responding to the demands and goat sales to the CSC have increased. However, any potential for increasing informal marketing to towns remains illegal due to strict veterinary regulations.

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The full implications of price and marketing policy for livestock have not been fully examined. There is an urgent need to do so in order to inform policy. There are obviously regional differences in patterns and implications, for instance between the high offtake areas of Matabeleland and areas of the high veld.

5.2 Beef fattening and sale/exchange

During the 1970s cattle fattening schemes became quite popular with CL farmers (Weinrich 1975; Zimbabwe government 1984:50; Le Roux et al. 1978:41-2; Bourdillon 1982:73). These are again being encouraged today. Fattening for sale through the purchase of supplementary feeds only becomes economic when the price ratio between beef and grain feed is favourable. Whilst the grain price maintains fattening as only marginally profitable, if at all, we can therefore expect to see a continuing reluctance to do this for sound economic reasons.

The equity implications of such a policy are clear - it really is only suitable for farmers rich in cattle. The encouragement of sale as against loaning or sharing has implications for farmers without sufficient cattle who at present rely on the excess cattle of the rich. A potential source of livelihood is withdrawn to the market. As the incentives increase to sell so the likelihood of sharing or loaning decreases.

Apart from this small, relatively rich sector of the CL population, most other cattle owners sell at the end of the useful reproductive life of the animal. This is only occasional and it is not worthwhile a farmer establishing a beef fattening system. An increasing trend in many parts of the country is for

such farmers to exchange old oxen with young heifers from commercial ranches. The oxen are then fattened for sale by the commercial rancher whose production system is geared towards beef, while the heifers enter productive use in the CL system. This complementarity generally works well to both partners economic advantage and possibly represents an avenue for further development of this "hidden" beef output from the CLs. The interaction is also useful in terms of encouraging an opportunistic stocking policy. If ranchers are able/encouraged to take excess cattle from CL range and provide animals for restocking after drought, there is a greater possibility of capitalising upon the economic advantages of an opportunistic strategy in CLs. The problem at the moment is that the breeds supplied by ranchers as heifers are often not suited to the conditions of the CLs (e.g. Sussex, Hereford, even Jerseys) and the resilience of the CL breeds is being degraded as a consequence. CL farmers are therefore keen for government assistance in gaining access to quality breeds such as Mashona, Afrikander and Tuli for restocking.

5.3 Breeding animals for the CL system

Nobbs (1927), the first Director of Agriculture in Rhodesia, recognised the qualities of indigenous breeds. He referred to the Mashona breed as "a splendid draught animal" and also referred to their resistance to disease, their fecundity and their hardiness. He comments that "the Mashona beast is extremely hardy... and thrives where an imported beast would starve". Above all he recognised the qualities of a multi-purpose animal, well suited to the environment and the local production system.

This recognition unfortunately did not persist. During the 1930s and again in the 1950s there were attempts by the colonial government to encourage the "improvement" of livestock breeds in the African farming areas. This was associated with the recurrent policy theme of trying to encourage offtake and beef supply. These attempts did not work. The introduced exotic bulls soon died and following these exercises government programmes invested considerable sums rebreeding indigenous breeds and trying to reestablish them, or spreading indigenous breeds, such as the Tuli, around the country. Given the experience of technical failure with exotics and the considerable research into the value of indigenous breeds (e.g. Oliver 1983) research and extension effort is now firmly directed towards more appropriate animals (e.g. Dlodlo and Ward 1987).

With this regained awareness, it is vital that breeding objectives are determined by the requirements of the CL production system. This presents some methodological problems. Evaluation of breed success generally takes place according to criteria used for beef production. Weight gain, calving indices etc and the indicators assessed (eg. Rennie et al. 1977). However, if this research is truly to serve the needs of CL producers these criteria need to be set according to farmer objectives - preferably using criteria used by them, such as hardiness and draught behaviour. There is clearly a role here for a greater interaction between farmer-based research on the socio- economic factors of production and on-station breeding research. An encouraging example is the Dairy Marketing Board appraisal of the feasibility of increasing milk sales from high potential CLs. Whilst acknowledging that milk breeds showed better milk production responses to supplements, it was still

recognised that it is of greater economic importance to have breeds capable of meeting wider objectives under CL management (Henson et al. 1983:49,54).

Until recently, goats have received scant attention in breeding studies in Zimbabwe. However, a number of investigations have been conducted since Independence (e.g. Khombe 1985). These offer many opportunities for increasing the output of goat products. Since goats serve a simpler role in the production system, primarily for meat production, the definition of objectives for the breeding investigations are straightforward.

Donkeys remain almost completely unresearched. There is clearly an urgent need for investigations focused on these vital animals. However as Chambers (1983) notes no Nobel Prizes have been won for research on such lowly topics as donkeys!

5.4 Managing vegetation according to CL objectives: range management strategies

The technical components of a range improvement policy must be determined by the economic objectives of the production system and the nature of the local environment. The primary management objective of CL livestock owners is to keep animals alive through the dry season and have a draught team to start ploughing on the outset of the first rain.

This involves a reliance on browse and "key resources" (see section 3) combined with the feeding of stored crop residues. Range improvement and livestock nutrition studies need to be focussed on these elements. To date this has been rather limited. The exceptions are current studies at the Matopos

Research Station on goat browse and some studies of stover production carried out by FSRU (Avila (ed.) 1984).

Bush clearance: The bias has been towards the conventional package of range management interventions - those suited to the commercial beef ranching system. This is not necessarily coincident with CL requirements. For instance, much effort has been expended on browse removal (i.e. "bush clearance") (e.g. Teague 1973). Although the removal of dense bush may be required in some areas a general bush clearance policy as advocated by some publications is likely to undermine the productivity and stability of the CL system. In general farmers will continue to oppose such clearance, arguing that browse is important to stock, that the effects on grass quality and quantity are not straightforward in heavily grazed systems and that woody biomass is valuable for things other than fodder. This multiple use of trees has been noted by Barnes (1978: 54-5), who nevertheless noted the value of controlling thickets and useless shrubs such as Lopholaena. Under low stocking rates debushing is often advantageous as it increases grass growth. This may not be of high quality and in a high use system may not provide the critical fodder requirements for the late dry season or in droughts. Grossman and Grunow (1980) have illustrated how under bush clearance although overall herbaceous biomass increases the availability of edible grasses may not. The impact of trees on encouraging palatable species has been studied by Bosch and van Wyk (1976) and Kennard and Walker (1973).

Veld improvement: Similarly, studies of veld improvement have focussed on the benefits of legumes for beef production

(Clatworthy 1975; Clatworthy 1984, reported in McClaurin 1984). Economic justifications for legumes should be made under trials in CLs, as these are the circumstances where they will be used. Species selection needs to be geared towards those that survive heavy grazing (Barnes 1978:56). Greater consideration needs to be given to nitrogen versus phosphorus (FSRU 1984:30) as limiting factors in different areas with appropriate consideration of the timing of these nutrient constraints on plant growth (Bremner and De Wit 1983). Additionally, arguments that legumes will raise feed quality should be based on consideration of the timing of the need for quality improvements. Barnes (1978:57) warns that dry season benefits in CL systems may not match those of beef producing ranches.

Under high stocking rates the possibility of introduction of legumes into pasture is probably limited. There is also the economic consideration of fertilizer use and protection during establishment (see discussion in Avila (ed) 1984). It has become recognised that fodder legumes can make a contribution if planted on protected fallow land (if available) or as hedges in the drier regions (Mombeshora et al. 1985). The recognition of the need for dry season supplementation comes through a clearer understanding of the farming system. The potential of natural "fodder banks" in the form of managed key resources, particularly in the drought prone areas has yet to be explored.

Trade-offs between productivity, stability and resilience:

The management of vegetation in CLs needs to balance the trade-off between productivity, stability and resilience (cf Walker et al. 1981). Production needs to be available at particular times of year and, especially in sandy soil savannas, of a sufficient quality (in terms of crude protein content etc) to maintain animals. This requires range management to ensure not

only biomass, but also quality. Decreases in grass quantity tend to result in increases in quality. This makes heavy grazing of sand veld important if dry season loss of condition is to be averted without supplementation. Grazing animals tend to prefer heavily grazed areas, at least until critically short of food, for this reason. This is why light grazing ranching systems often have the problem of localised overgrazing by stock.

There is evidence (Kelly and Walker 1976) that heavy grazing leads to greater variability in productivity and this poses a problem for CL livestock. A consequence of this is the focus on "key resources" during critical periods of shortfall, as is the strategy of migration. Such instability is not necessarily linked to degradation. In Walker et al's (1981) model of dryland grazing systems commercial ranches were characterised as systems of high stability but low resilience: whereas peasant farming systems were the opposite. Low stability (large fluctuations of available production between years) may act to increase resilience (the ability of the system to withstand severe shocks or disturbances, such as drought) through the selection of well adapted vegetation species and growth forms. In southern Midlands Province grazing assessments carried out by Agritex in 1985 (after the serious drought of 1982-4) found that grass cover in the CLs was generally higher than in the commercial ranches. This result surprised the officers in question, who could not interpret it and may not have reported it fully. We suspect that it was because CL grazing was more resilient than that on the ranches, so that it could bounce back after drought more quickly. One explanation for low resilience on commercial ranches is that because perennial species died off there leaving very little plant cover in

subsequent seasons. In the CLs in contrast the predominantly annual species grassland had fared better during the drought and due to a greater seeding rate could respond to increased rainfall more quickly. CL farmers are well aware of such resilience. For example we were amazed to find them wanting to plant Euphorbia and Opuntia in rangelands; browse that would only be eaten in the most extreme droughts.

5.5 Developing cropping within the stock access constraint

Considerable progress has been made by the FSRU in the recognition that existing agricultural recommendations can only be implemented by those with large cattle holdings. Therefore they can neither be followed by the majority, nor be planned for at the community level.

The challenge is therefore to develop practices that have reduced demands for livestock inputs. This has proven very difficult. Fertiliser use to substitute manure has increased greatly, but there remain economic problems (Bratton and Truscott 1984; Drinkwater 1987). Successful CL fertiliser users combine it with manure, leaf litter and termitaria allocations for sound agronomic reasons. These require stock for producing it or carrying it. Long term experience with fertilisers elsewhere in the world also cautions against dependence on them for economic and ecological reasons.

Reduced tillage has been addressed by FSRU (Shumba 1984b) and there are certainly plenty of possibilities. However there are again considerable technical problems to be solved. Extension advice suggesting greatly increased inputs, eg. ridging, will necessarily be compromised by shortage and inequality in

draught access. Clearly it is illogical to combine such recommendations with attempts to further destock. Measures to improve the ploughing season condition of draught animals are clearly sensible, but it is important to reject the fallacy that draught animals do not work during the rest of the year. A tremendous amount of cartage is done by cattle and especially donkeys.

Attempts to further integrate livestock and arable production with fodder crops and treatment and storage of crop residues seem sensible, but detailed study with effective farmer consultation are required. Socio-economic factors such as the conflicts in the timing of labour inputs and the complexities of sharing stock but not arable land interact with technical questions. The regional differentiation in trends in arable:grazing land ratios are also significant in designing technical recommendations (see section 8).

6. SOCIAL ORGANISATION OF PRODUCTION

6.1 The limits of households as tools of analysis

Households are the focus of most rural surveys, though there is wide recognition in the literature that there are problems. It is worth pinpointing the reasons given by researchers for taking households as the unit of study. These are that they are units of asset ownership (land, stock, buildings, etc), units of consumption ("eat from the same pot"), and units of production (using common assets and labour). These definitions do not always work in Zimbabwe as elsewhere. Assets are always individually held: it can simply never be said that such and

such a household owns so many cattle. Even a fruit tree in the yard will probably belong to one of the children who planted it. As each member of the household has their own private money, including married couples, each uses it to meet the welfare of different people within and beyond the household. Even in regard to consumption of staple meals many households have more than one kitchen. Apart from the senior men each member will be allotted to a different kitchen, and there can be dramatic differences in levels and types of consumption. These kitchens also imply wider division within the household, with each wife and the mother-in-law generally having their own unit, though there may often be co-operation between them.

In areas we have worked in southern Zimbabwe households were found to be defined as discrete pieces of land with a single owner. Households were seen to develop on a plot belonging to a single individual. Everyone who came to live on that plot had to recognise that land owner as the authority. This means that households have owners, not heads, and explains cases where men are in authority over their fathers, etc.

6.2 The question of livestock ownership

Every report on livestock in Zimbabwe quotes "ownership" or "holding" data and draws out some implications for development from this. Here we want to discuss the nature of ownership, and on the basis of this ask some questions about how we can interpret the data available.

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How good is the data and what does it mean?

Ownership is sensitive: Large samples with single round surveys are prone to inaccuracies because of misunderstandings during questioning, and deliberate attempts by people to distort figures. We found that we were still clarifying stock ownership data a year into intensive field work with a small sample. If the issue at stake is whether a few individuals own much of the stock, then the evasive answers of a few big stock owners can prove critical. It simply is not true that large surveys will overcome such inaccuracies. Rural people in Zimbabwe are aware of the perceptions of government and outsiders, and wary of the use to which statistics will be put. Hence they tailor their answers carefully to protect their economic interests in regard to outsiders. Answers are also orientated to local factors including disputes over equality, marriage, blood money, inheritance etc., as well as concerns about local stock number control.

Definitions of ownership: The precise way in which different surveys have defined "ownership" and "holding" mean that it is difficult to compare results. It is not known the degree to which each enumerator in those surveys used identical vernacular questions and thus within surveys variation may thus also exist.

Linguistically "ownership" is a difficult concept to translate unambiguously into chiShona. Uridzi (ownership) is most often used in connection with ownership within spiritual jurisdiction (eg. tribal territory). The most conversationally appropriate way of asking about ownership is to ask whether a person "as"

stock, but this leads to problems of definition between holding and owning.

Mune mombe, here? does not make it clear whether animals "held" are to be included in the answer, or whether animals owned but held by others are to be included. Specific questions about ronzera (loaned beasts) and miraga (out-loan places) would have to be asked. Further, this question would be addressed using the respectful plural to an individual who would not know whether to respond personally or for the family or household as a whole. This is likely to be most ambiguous in the case where there are pretty independent mothers, sons or brothers technically within the "household". It will also prove a problem when absentee ownership is significant, as such beasts may or may not be reported.

Phrasing the question more specifically: Mune mombe dzingani pamusha wenyu? (how many cattle do you have at your homestead/village?) or ko, mune mombe dzingani mudanga? (how many cattle are there in the kraal?) is more helpful. Clearly this aims entirely at household holdings, and does not report ownership. Two examples where this would not have worked in our sample are where livestock from several households are kraaled together at a central point, and where individual cattle build up "relationships" with neighbours cattle and hence prefer to dwell in the other kraal!

If data on "true" ownership is required then the questions will have to be backed up with specific sub-questions about rights to sell etc. Then on the basis of these stock can be allocated to individual persons. It should be realised that these will necessarily be arbitrary decisions. For example, stock held

between death and nhaka (the formal inheritance ceremony rarely less than a year to 18 months after death) will not be assignable. Similarly, many stock are held virtually "in trust" within patrilineages to which a number of individuals and households have specific rights that weaken the right of the "true" owner. Without getting lost in detail, surveys have to relate their functional definition of ownership to the uses to which they want to put the resulting data.

Using ownership data: Where the ownership/holding survey was to establish the access to cattle/stock neither "ownership" or "holding" data are actually appropriate measures. It is well known that owned beasts may be held by others but less attention has been paid to the rights of access of cattle holders who are not owners as against rights in other stock sharing relationships. Holders lack some of the rights of disposal and to offspring, but at times even rights to draught, milk and manure may be compromised. Formal rights of the relationship are on occasions abused when cattle are mistreated or offspring stolen. Furthermore, holders may have to reciprocate with labour, other equipment etc. which affects their wider involvement in arable production. In some circumstances a farmer who holds four cattle of a neighbour may be "worse off" than one who has no cattle in the kraal but shares freely with a neighbour who owns a large herd of ten.

It is also a mistake to assume that cattle held or owned by a household are used equally within that household. Where there is more than one field holder in the household, as is common, there is frequently differential access. In addition it is possible that different field holders, each with cattle, have different sharing relationships with other households.

The other main use of ownership data is to discuss the issue of "equality". Here again it is clear that interpretations of impact of inequality in stock ownership can only be appraised in the light of the specific rights and obligations of such ownership. These issues are addressed in sections 6.3 and 6.4.

It is also important when creating tables of ownership to pay very careful attention to the way in which sampling frames, of both households and individuals, are drawn up. The problem of household definition is addressed in section 6.1 and it must be realised that whilst no definition will always work it is essential that reasonable and explicit definitions are used. In our sample there are a number of cases where we and different household members disagree on household boundaries in ways that cannot be resolved. Cognisance should be made of the fact VIDCO lists are both made by people who know the area, and yet are also "political" in that they are trying to create and fix the right numbers of people and homes in a very fluid situation. Due to the various forms of labour migration it is not possible to create absolute lists of household members or actual and potential community members. The implication of this for tabulating ownership by age and sex is that some simple categories of residence should be included with statements of how the figures were obtained for each group.

6.3 Ownership and the rights of women

The question of women's ownership of stock is often raised by surveys in Zimbabwe, but rarely is the data amenable to investigate this. Data tends to be presented as household holding which tells us very little about women's rights. When male household owners are interviewed they are apt to report

stock, such as goats, as belonging to them, whilst when the wives are talked to it may turn out that the women had in fact actually purchased them. Women acquire livestock through different routes to men. The customary gifts of the magungiro goat or the mombe youmai may be important ways of starting a flock and herd. In the past, before the Native Land Husbandry Act took away the right of women to be allocated land, women often acquired independent herds of cattle through the farming of their land and the sale or exchange of their produce (often groundnuts). Today women concentrate on the acquisition of goats through herbalism or the sale of garden produce or handicrafts. "Shona" "customary law" clearly recognises the rights of women to such ownership including the right to a separate inheritance estate (Holleman 1952), though this may sometimes be abused (Pankhurst and Jacobs 1988).

Women often transfer "ownership" of their animals to their children, partly as the kuedza ropa custom (see below), and perhaps also to protect ownership. Livestock owned by married women may also be transferred to her father's home to further ensure their security.

Goats owned by women are important for household "welfare". Many women use investment in goats as a way of providing a private income which is relatively well protected from their husbands. This money is used to secure the welfare of their own children, in a situation where the man's income had pressing claims from other wives and the wider patrilineage, as well as for beer and girl friends. Thus two households each owning the same number of goats, would be in a very different welfare situation depending on the actual structure of ownership within that household.

6.4 Children's rights to stock

Considerable numbers of stock - especially small stock and poultry - are "owned" by children. However, outright ownership is rare as they can neither obtain the funds or be expected to inherit at such a young age.

Most such "ownership" is under kuedza ropa, a "Shona" institution of "testing the blood" to determine whether the child has the luck/spiritual force of giving fecundity. If they have it, more animals will be entrusted to their "ownership". People may also say that they are trying to develop children's responsibility. These animals may become the permanent property of the child, especially when given to boys. These are often the first goats of a man's flock. The child nominally has full rights over the beast and must be consulted if it is sold or slaughtered. If the animal is given to a young girl she too will "own" it but it is rare that she will carry her flock to the home of her new husband when she marries. She retains some rights over the animals, but they stay at her parental home.

6.5 Lineage social organisation

Patrilineal clusters: Shona and Ndebele social organisation is strongly patrilineal; the economic and social interdependence of the men in the shallow patrilineage is generally very considerable. Such clusters of male relatives are not the only social groups in rural Zimbabwe, but they are the main one. These men will necessarily associate to handle domestic and economic problems such as arable land access, paying and receiving lobola (bridewealth), meeting the needs of old and sick members etc. They tend to be heavily indebted

to each other through such things as school fees and bridewealth. This interaction involves conflict and disputes as well as cooperation. The exact nature of the association in a given family tend to change quite frequently.

Such groups are often headed by patriarchs who have acquired wealth and influence. Not all old men achieve this, and such groups may be led by younger men on occasion or even hardly led. It is quite common that poor members of outsider lineages (vatogwa or varanda) are attached to such groups, especially as in-laws. Such organisation has important implications for agricultural production.

These groups tend to work with livestock in common, within a general context of working together on a wide range of basic economic activities. This is how most people without stock gain access to them. Although in part egalitarian, these associations tend to involve exchanges of labour by poorer (often younger) members for access to the capital (especially stock) of the senior members. Real differentiation can thus only be achieved by an initial break to individualisation. But this is very costly because of the benefits in productivity and security of tight integration. Cheater's research (e.g. 1983:84) has shown just how well aspects of this lineage organisation of production can fare under freehold in the Small Scale Farming Areas.

This organisation and structure does encourage accumulation by individuals, especially old men, as a political strategy of enhancing their own position within the lineage and ultimately the community. This provides an explanation why social scientists can report such stock as owned for "prestige" whilst

agriculturalists can find them being owned so as to carry out agricultural work. There was never a contradiction as this very prestige was rooted in the stock's economic value; the stock working for political dependents.

Ancestral spirits and lineage organisation: Leading (often old) lineage members enhance their position by being able to articulate and meet perceived needs of family spirits. This again has all kinds of economic ramifications for the group as a whole. An example is the role of dedicated spirit bulls among "Shona" peoples. Bulls carry the name, and symbolise, significant lineage ancestors (Bourdillon 1982: 25, 222). They annoy agriculturalists who see them as scrub bulls, not selected for their genetic characteristics, nor available for technocratic planning due to their spiritual identity.

Sacred bulls can be interpreted as an institution to ensure that sufficient bulls are available to serve cows whilst most males are castrated to be draught animals. However, such a system is hardly as effective as actually organising for the correct ratio of bulls with a reasonable spatial distribution. Furthermore the need to dedicate bulls and later slaughter them, without reference to an agricultural timetable, makes it a pretty inefficient method.

The likely explanation for why sacred bulls have continued to be important in most areas, and are viewed with enthusiasm by their holders, is that they actually enhance the political and economic status of the lineage elders who hold them. Thus attempts to eliminate sacred animals on the argument that they are useless and backward and should be replaced by animals that offer "economic" benefits are unlikely to impress the

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patriarchs involved, unless there are first changes in social organisation.

Bridewealth payments: Lineage structure is also reinforced by the payment and receipt of bridewealth partially in cattle (mombe youmai and pwanja zhowa are supposedly live beasts). Whilst bridewealth is still calculated in numbers of beasts those are classificatory beasts which are worth only half a live beast in cash, so beasts tend to be sold rather than transferred live. Thus again statements that bridewealth is a social function of cattle miss the point that lineage relations are as economic as they are social. Social scientific research, such as Kuper's Wives for Cattle: Bridewealth and Marriage in Southern Africa, is at pains to point out that the ritual, ideological and social content of these exchanges does not compromise the economic rationality of livestock management (1982: 167).

Inheritance: Property distribution after death occurs amongst "Shona" only after some years, when the kurova guva or kugadzira ceremony is conducted. There are different categories of property and also responsibilities. Here we are concerned with nhaka, which are essentially major assets centred around wives and cattle. During the preceding interval since death arrangements have been made, though not necessarily agreed, as to the distribution and these are made good on this day. Generally speaking assets are distributed to men within the shallow patrilineage according to their seniority: typical collateral inheritance. This system retains wealth in the senior echelons of the patrilineage and also prevents it from becoming overconcentrated. Only in unusual situations will sons be able to take over their father's cattle directly. This is

often where, for various reasons, wives hang on to the husband's property. This can usually only be achieved where there are few or weak male relatives eager to get hold of assets or where the wife has considerable influence and can clearly maintain the home as a unit as it is.

The muzukuru (sister's son) of the deceased may inherit a beast through the institution of kusuka uta (the washing of the bow). This by-passes the seniority of collateral inheritance. He achieves this through his particular ritually empowered position in the lineage structure (Aschwanden 1987:13).

Compensatory payments: Fines of various kinds are paid to goats and even cattle where extreme cases of adultery and murder are involved. Such payments have become less common with the reduced power of the chiefs' courts. Nevertheless this can still lead to occasional exchanges of stock. Receiving and paying of such fines again involves people as members of patrilineal groups.

7. INEQUALITY AND DIFFERENTIATION

The patterns and meaning of inequality in the rural areas is again another subject on which information is scarce. There are immense methodological problems of assessing the patterns of asset ownership and rural incomes. We have discussed some of the problems associated with cattle "ownership" above. Assessing the degree to which anyone's income is used to benefit different categories of people within and beyond the household is complicated. Individuals control flows of cash and spend them rather independently, though they do have

obligations to others. The fact that food consumption units, kitchens are often discrete units within a household also has an influence over income distribution. Income flows between members of a shallow lineage group also occur, especially in regard to school fees and such like. Remittances may be sent to a group of "households" and expenditures shared by such a group. Despite increasing recognition of intra- and supra-household economic organisation, few techniques for analysing income patterns at these levels have come into common usage. This remains an important methodological challenge for the future.

7.1 Historical patterns of differentiation

Pre-colonial Zimbabwean societies were marked by a high degree of differentiation. In the Shona "kingdoms" and the Ndebele state elite power stemmed largely from the control of very large herds of cattle (Bhila 1971; Mudenge 1974, Garlake 1978; Cobbing 1976). In the small independent groups, especially in areas and during periods of cattle shortage, power derived from the control of labour, as well as fortress sites and vleis for farming (Wilson 1986). The basis of this authority was destroyed by the Rhodesian military machine in the 1890s and by the opening up of labour and commodity markets which gave new and more independent opportunities for accumulation.

An initial effect of this was to encourage the growth of peasant production amongst resource endowed farmers, the hurudza. These ploughing entrepreneurs often accumulated considerable wealth, especially in stock, both through sales to mines and towns, but more importantly in exchange with other farmers, especially during droughts. Certain stock rich

individuals developed enormous cattle herds at this time setting up extensive loaning networks. Such differentiation was seen as competitive by white commercial interests and hence attacked through a whole series of discriminatory policies (Arrighi 1970; Phimister 1977; Palmer 1977; Ranger 1985).

Increased land shortage (largely due to the implementation of the Land Apportionment Act) and destocking decreased the opportunities for rural based accumulation. This combined with policies discriminating against farmers marketing to the national economy. Simultaneously with the crushing of rural based differentiation, these policies also had a general effect of retarding rural production and maintaining CLs as labour reserves for the white controlled economy. Local economic opportunities also declined for example through the decreasing appropriateness of exchanging cattle for grain due to changing price ratios.

Remittances became increasingly important in supporting the rural economy at a subsistence level. Under colonial rule Africans had limited access to well paid jobs, being involved in very poorly paid labouring jobs in the mines or on the farms. Remittance money flowing into the rural areas was thus rather small and fairly evenly distributed and did not contribute in itself to rural differentiation, though it certainly did to economic survival (Johnson 1968).

Since Independence the opportunity for high urban incomes has been greater. The labour market has not expanded however, meaning that the level of youth unemployment has increased. This means that a section of the population with a rural base is now unable to secure off-farm employment, while another

represents relatively high income earners. We can expect this new situation to dramatically affect investment patterns and differentiation in the CLs. Much rural differentiation in Zimbabwe is thus a function of differential incomes from urban sources - i.e. the "salaried" elite of Leys (1986) (see also Jackson et al. 1987:53). This is resulting in great differences in rural lifestyle emerging - in housing, in education, diet clothing etc. It is also changing the possibilities of entry into productive farming, which is well known to be rooted in gaining access to livestock. This is because livestock investment, especially initial acquisition, is dependent on remittances in most areas. In the high potential areas crop sale generated investment is more common. Studies must investigate the degree to which that rural socio-economic processes are linked with urban ones.

7.2 Absentee stock ownership:

Entry into the urban economy to raise capital sufficient to establish rural production has long been a familiar feature of the domestic cycle in Zimbabwe (Bourdillon 1982:86). This investment is largely focussed on the acquisition of livestock. At an initial stage stock are held in the CL by male relatives. This investment is welcomed by those receiving stock in the rural areas and bolsters rural production. Le Roux et al's (1978: 44) picture of "the wealthy businessman or those with well paid jobs elsewhere... using the tribal areas as a holding ground for their stock" is less familiar in most areas. Section 7.4 and 7.5 address the issue of what opportunities would allow such stock owners to "escape" into beef production.

The increase in absentee herd ownership in many pastoral areas has had a big influence on the nature of the local production system. In Kenya, Little (1985 a and b), for example reports on the consequences for the Il Chamus of Baringo. Investment in livestock by townsmen, traders or those with access to irrigated agriculture is occurring to the detriment of poorer stock owners and perhaps the environment. A change in the regional economy has reduced the effectiveness of traditional livestock markets. Less access to irrigated plots and urban employment mean the poor must rely on increasingly marginal, subsistence agropastoral production in order to survive. It is only the absentee owners who have the option of entering the commercial economy and the process leads insidiously to increasing rural differentiation.

Investigative research into absentee ownership is needed to explore its nature and consequences in the different regions of the country.

7.3 Inequality in stock access and agricultural output

As described above access to draught and manure is largely determined by the ability to secure use of cattle from patrilineal relatives. The extent to which claims can be made on agnatic "brothers" can be very wide and there are many different forms of temporary or permanent associations possible.

Access and environmental factors: Access to manure versus draught are likely be differentially significant depending on ecological factors. The drier the area the more important the timely planting of large areas. This enhances the importance

of draught. Poor soil fertility becomes an increasing constraint the wetter the area is. Local differences in parent material will also affect intrinsic soil fertility and manure is obviously especially important on Kalahari sands and areas of granite with poor feldspar content. In the highest potential areas where fertiliser becomes economic, farmers can partially escape manure as a constraint. The implications of such environmental determinants to stock access differentiation have not been explored.

Patrilineal clusters: In our own studies we found that the dominant production associations were between men of shallow patrilineage groups (fathers/brothers); sometimes with poor in-laws attached. Sometimes these interactions were quite unequal with the poor partners having to do most of the livestock husbandry (herding) and agricultural labour, with poorer access to stock inputs for their fields. However, in general we found that the richer partners were quite constrained in their attempts to exploit their position. In part this is because, in the long term, they too may become dependent on others and generosity is a good insurance. The rich tend to be relatively old men who know as they become older they will fail to maintain their status except with some good will from the younger men. Furthermore they are often as concerned with building up political and social followings as they are about economic privilege. To some extent then social factors blunt the effects of inequality, and this is why poor as well as rich rural people will tend to oppose attempts to destock the large owners (unless the stock are transferred to the poor!).

Cooperative organisations: Groupings of farmers into voluntary working associations is common throughout Zimbabwe, as elsewhere in Africa (eg. Richards 1986). They take on a variety of different forms with different "functions". Some involve mere formalisations of beer work parties, but others are extremely well organised to meet contemporary problems and constraints of labour access. These groups vary greatly in the extent to which they integrate the production of different households. They also vary in the degree to which they incorporate poorer farmers. Research has shown that to some extent these groups do block differentiation by equalising stock access (e.g. Bratton 1987). Manure tends to remain the property of actual holders as is the case of lineage clusters, and is therefore not shared to the same degree as draught power. The degree to which ideology and simple material self-interest are motivating such group formation remains largely unstudied. We speculate that they are presently most important in the more commercialised areas of highveld Mashonaland. The growth of such cooperation, side by side with commercialisation and an apparent weakening of the lineage structure, suggests that they may play a considerable role in Zimbabwean agricultural production in the next decades.

Such groups often have good working relations with agricultural extension officers. Research by Drinkwater (pers. comm, 1988), among others, has shown that supporting such local institutions has a lot to contribute to rural development.

The growth in draught hiring: It is well known that commercialisation of crop production since Independence has driven a parallel commercialisation of draught as an input. This is particularly evident at the time of the first rains

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when there is tremendous competition to plough and plant quickly. It is also a feature of the scotch cart rural transport market. The financial gains of now hiring out draught are now considerable and it puts a growing strain on cooperative relationships. Disputes over "traditional" rights to graze stover in non-holders' fields have become widespread and have led to the burning of residues in some cases (see also Henson et al. 1983:47-8). Stover is now being sold in many areas, or exchanged with cattle holders as part of the deal for ploughing.

Historical and ecological dynamics of changes in cooperation:
In the southern areas of the country best known to us the intensity and form of cooperative relationships are highly influenced by cattle numbers. In the 1970s when cattle populations were high there was a good deal of loaning of cattle from owners of very large herds. The number of people with insufficient draught to make up a draught team was not as high as it is today. The number of owners with surplus cattle meant that the stockless could usually assure access either through ronzera or sharing on relatively good terms.

The need for tight cooperative groupings based on shallow lineage groups has emerged as a dominant feature after the heavy losses of cattle during the 1982-4 drought. Although these relationships certainly were not absent in earlier times they are now crucial to production. In contrast, Bratton (1987: 232) recorded a declining frequency of draught pooling after drought. He records that proportional lending to "relatives" as against "strangers" did not change, although the definition of a "relative" is not clear. He found that commercial hiring out was replaced by reciprocal relations in these areas

(Chipuriro, Wedza, Gutu and Dande CLs).

It is noteworthy that the growth in CL economic opportunity since Independence has led to major shifts in the enthusiasm to produce and invest. One consequence of this seems to be that people who were once prepared to rely on being dependent upon others are now more anxious to be owners themselves.

In other areas of the country the pattern may well be different. For example, rainfall variability and the recent droughts (1982-4; 1986-7) presumably have less impact in the higher rainfall regions. Lack of cooperation with cattle either through reduced incidence of kuronzera or of sharing among groups of people may arise through a number of routes. Long term and in-depth research is needed on how the nature of social organisation and ideology shapes the impact of ownership inequality on differentiation.

7.4 The household development cycle and the opportunities for beef production

As has been discussed in earlier sections the primary agricultural input role of livestock is not really challenged by herd inequality as large herd owners lend or hire out stock to others. This section looks at the opportunity for cattle to become commercialised in the sense of changing their primary function from one of provision of inputs to the offtake of beef amongst large herd owners. The opportunities for this to occur are limited. Obligations to others at various stages in the household development cycle mean that the chance of building up a large herd and "escaping" into a beef production enterprise are restricted. No doubt most communal area

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producers would like to own many animals and leave them to graze in large herds on the range selling them at intervals and stay at home not worrying about agriculture or securing remittances. In addition to the lack of available land there are a number of factors that ensure that this happens only rarely.

Behnke (1987) comments on the situation in rural Botswana:

The cyclical nature of the development process.. suggests that many of these smaller herding operations will not succeed in permanently crossing the threshold to commercial production. Only at a very late point in their working career will many livestock owners even contemplate the possibility of adopting more expensive management practices, selling animals in large lots, or investing capital in water development. For this reason marginally "commercial" livestock operations may have a very short life expectancy. Increases in herd sizes in one generation are liable to be dissipated by epidemic disease, drought, or in the retirement of the family head and the fragmentation of the herd in succeeding generations. Many of the resulting smaller, second-generation herds would again be viable only on a subsistence basis.

In Zimbabwe a similar pattern can be conceived of. As a herd grows increasing demands are made of it by relatives. The strength of these demands will be dependent on the number of overall cattle available and the demand of the general population for stock. The chance for "commercialisation" (i.e. sale in significant numbers) is restricted and may be only possible if a chance set of circumstances combine. Even in drought, though sales do rise (see Weinrich 1975:113-4), large cattle owners are reluctant to sell as the liquidated capital then becomes open to claim by members of the lineage grouping. In such circumstances large proportions of the money will be spent feeding relatives or keeping their children in school

etc. It will be very difficult to refuse to help others and ones' own household members. This money will not be easy to refund after the drought. Therefore people know that it is not the case that they can sell cattle at the start of the drought in order to avoid loss, simply purchasing afterwards.

7.5 Grazing schemes, beef production and the potential for inequality

Other mechanisms by which the "escape" to commercialisation (beef sales) may occur are explored in this section. In other African countries this trend has been observed. In Botswana, Behnke (1986;1987) describes the process by which richer herd owners, particularly with access to income from town, are able to acquire the necessary inputs to invest in a commercialised beef production business. In Botswana this particularly means investing in water supplies: ensuring boreholes are built in order to open up inaccessible rangeland. It also means the purchase of the necessary veterinary and supplementary feed inputs.

In Zimbabwe gaining access to extra landed resources is really only possible for the CL farmer if he purchases land in the commercial sector. However, the releasing of obligations to others may be enhanced by the enclosure of land and the establishment of grazing schemes. With a fenced scheme the need for herding is reduced and so is one of the major incentives for loaning out cattle to others. Kuronzera will probably decline with the establishment of grazing schemes. Thus the herd unit will not be subdivided into small subsistence herds whose function is to provide arable inputs to the holder. Though under this system they are held as an investment for the

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owner, it is difficult to mobilise the income through sales due to social pressure. With the need of herding eliminated the option is open to consolidate the herd unit and regard it as a commercial ranch herd. The degree to which this is happening and can be controlled by grazing scheme committees has not been investigated to date. However, it is rumoured to exist in southern grazing schemes.

8. MANAGING ARABLE EXPANSION INTO COMMUNAL GRAZING AREAS

The maintenance of existing grazing systems and the main recommendations for their improvement (rotational grazing schemes), are predicated on the ability to retain communal land for grazing in the face of arable expansion. This section explores the degree to which existing trends suggest this is so, and what the responses to different kinds of land use pressures in CLs might be.

8.1 Historical introduction

A mythology of chiefly allocation of shifting cultivation farming lands has grown up during the colonial era, through an intense interaction between administrators, chiefs and anthropologists. In this version lands were allocated by wardheads and chiefs, with the land remaining the property of the community at large. The land was held by the chief in the name of patrilineal ancestors, elevated to the role of land spirit guardians. It is necessary to first examine the faults with this mythology so that a more realistic appraisal can be made. Firstly, this model is ahistorical, though it is justified on the basis of "tradition". At least in southern

Shona areas the dominant nineteenth century farming system was not shifting cultivation at all: rather it was essentially a system of intensive, continuous farming of vleis areas. The largest proportions of these lands were held by petty "warlord" chiefs, between whom land passed through conquest or inheritance. Commoners attached to these patriarchs were not economically self-sufficient, and largely worked on the chiefs' holdings in tribute labour, and in exchange for food and wives. They had small plots of land, which were any area not being already farmed, but social control over them was not through allocation of land, but rather directly political, and through their lack of access to labour. In section 9.1 it is argued that even the existence of defined chiefly and ward territories does not actually date from the precolonial era. Given these realities it seems likely that chiefly control over land allocation evolved in the colonial era as a substitute for direct political power.

The second problem with the chiefly allocation model is that it does not explain the actual patterns of land access even during the colonial era. What actually existed was an on-going struggle to control land access between different categories of chiefs, commoner lineages, individual farmers, and the state. The fortunes of each group have clearly varied through time and by area. The area in which we did intensive fieldwork may be atypical. It is marginal, and the Native Land Husbandry Act (NLHA) was only ever directly implemented in half of it, and this was not until 1960-1. In this area, it is clear that shallow patrilineages have retained the strongest control over land allocation. Detailed research will be needed in other regions if a national picture is to be generated, but there is a fair amount of evidence that this pattern is quite general.

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The NLHA has affected land access on a permanent basis, but the actual patterns of "ownership" and "access" have once more developed into a variant of patrilineal control. Formal chiefly control of land has not been able to challenge this, even after the rights were given back to them with the repeal of NLHA. It is also quite common for individuals to have successfully expanded arable production without community sanction or control. This seems, in fact, a continuation of behaviour before the NLHA where people achieved permission only in name for expansion of land, and the chief component of such a grant was the financial payment of badza. Even this payment tended to be confined to first time settlers in a community. It almost provides right of residence rather than right to use a particular farm. Arable allocations by chiefs, and indeed by VIDCOs today, have tended to be of lands the owner of which had no surviving relations present. The implication of this analysis is that it will be very difficult for government to closely control the allocation of arable land within these blocks without taking on patrilineal organization and inheritance procedures. However the signs are that people are themselves ready to solve land re-allocations within their lineages, at least in areas of medium "over-population". It may be mainly in areas where sub-holdings become so small that they are totally uneconomic that people will throw the problem on the state and the grazing commons.

8.2 Arable land expansion: extent, causes and control

Various national figures suggest that in most areas of the country there has been a steady expansion of arable area into grazing lands over the last two decades (Whitlow 1979; Abel

and Blaikie 1988:90). Following the abandonment of the NLHA in the early 1960s there was a wave of new allocations to people who had been denied land during the previous decade. During the liberation war in the late 1970s there was also much illegal expansion as part of madiro: an ideology of individual freedom to counter colonial technocratic control. People otherwise denied arable rights do not find much opposition to their expansion into grazing land; indeed they have almost a "moral right".

Since independence expansion in most areas seems to have slowed down. However, it seems to have remained rapid in the most overpopulated high potential areas and in the areas of spontaneous resettlement in the north. In some areas, especially in the drier regions of Midlands (south) and parts of Masvingo, local government pressure has actually led to a shrinkage of arable as people have been re-expelled from NLHA-defined grazing areas.

There are several ways in which "invasion of the commons" is continuing to occur. One method is the continuation of madiro whereby portions of land adjacent to the existing holding are incorporated. Similarly farmers can eat into drainage lines and path areas. This expansion is mainly done by resource rich farmers, for whom arable land is a severe production constraint. Likewise these tend to be the important people in the area, holding political posts, and hence less subject to community eviction. A second method is opening a new field within the grazing area. Sometimes the "permission" of a local authority (sabhuku, chief, VIDCO chairman, Councillor, etc,) is sought, generally casually, though of course such allocation is illegal. Such allocations are often made to young men who

cannot wait for inheritance of land, or whose existing inheritance is too small. However, in one area visited in 1985 it was stated that it was the old important men who moved into the grazing, allocating their old fields to their land short young patrilineal relatives. This was justified by locals on the basis that nobody would be able to stop important people occupying grazing lands.

Direct "squatting" by outsiders on grazing land is found in some CLs. These people may also seek some local permission and make illegal payments. As they are desperate for a livelihood such people are extremely resistant to expulsion. There may often be resentment by local people, but again it seems that the right to farm to survive - even at common cost or cost to another community - is powerfully recognized. In one CL visited in 1985 squatters had settled in a straight line to mimic NLHA patterns. This had apparently diffused attempts to expel them, because, according to informants, it indicated that they were prepared to be under the authority of the state. In recent years a strong movement seems to have been fostered by local government to ban all "immigration" into CLs, and this seems to be having some effect.

The most significant method of arable expansion into grazing lands is through home fields around the homestead. This is particularly a feature of sandy soil areas under population pressure. This may be most significant in the highest potential areas, but we know of no research investigating it in these areas. The reasons for this are not only to extend arable access, but are also agronomic. Home fields enable the application of higher rates of fertility inputs without transport problems and the benefits of homestead litter may

also be considerable. Such homestead fields have been found to be more intensively farmed in many regions of the world. Old homestead sites are preferentially sought for cultivation in many of the sandy soil areas of southern Africa. These fields also enable crop guarding from livestock, and hence earlier planting, in those CLs where the general herding of cattle is instituted late (e.g. Chilimanzi, Drinkwater pers. comm. 1988). Generally accepted local "law" is that people have a right to farming around their homes, and to farm their old homestead sites. However, from cursory observation it would seem not to be a feature of some areas, such as parts of the Sabi Valley. Though government has tried to oppose home-field use from time to time in some areas, it has not been actually able to suppress it in an organised way. Farmers have been able to extend home field areas both directly, and also more cleverly by rotating their homestead sites bringing more and more land into cultivation over a period of decades. Such home fields tend to be much more productive than the "out fields", and it is noticeable that most of the really productive farmers have managed to obtain home fields in one way or another. Attempts to destroy home field use, or to villagise people, will therefore have a negative effect on productivity. Again it seems that locally recognized rights seem to be sufficient to limit land use planning exercises.

8.3 The economics of land use change: regional patterns

The policy response to expansion of arable is probably best based on an assessment of the economic costs and benefits to the communal area farming systems. As in other areas of Africa the enclosure of common range resources often has an economic root (Behnke 1986b). An economic assessment would include a

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consideration of short and long term dimensions (i.e. include conservation aspects and take realistic stock of the effect of growing populations). Our contention is that there are likely to be differences by natural region, and that uniform national policies are unlikely to suit every part of the country.

High potential areas: a trend to integration?

In the high potential natural region two (and three?) areas it probably is the case that the returns on opening up arable will remain higher than the costs in terms of reduced grazing for livestock. The densities of livestock will inevitably fall somewhat, though we can expect to see increasing use of crop residues and even production of fodder crops to try to off-set this. Such a process has occurred in very many parts of Africa, with little or no outside technical intervention. However, given the poverty of CL soils and the marked seasonality of precipitation, fertiliser and perhaps tractorization will have to be used to supplement livestock. Indeed, such a trend is already apparent in these areas, despite marginal economic profitability.

Another phenomenon observed in these areas is that a (highly illegal) enclosure of common grazing land is occurring. This is mostly on a small scale, involving land around homesteads, and sometimes around areas of old fields that are abandoned to provide private grazing whilst new lands are opened elsewhere. Once it becomes profitable to privately enclose grazing it is very difficult to stop this happening, where there are individuals who can act in defiance of community feeling. It seems that such enclosure is nevertheless meeting political opposition in some areas. Enclosure of grazing adjacent to or

around homesteads and fields will increase the trend towards the creation of integrated "small-holdings" along the lines of highland East Africa.

In these areas the shortage of arable land is such that the only alternative to reduction in grazing land is large scale landlessness. As formal employment cannot hope to absorb this population such landlessness will lead to a further intensification of the demand for resettlement on the formerly occupied adjacent high potential areas. This will require difficult decisions by government (Cliffe 1986).

Arable expansion in these areas is therefore both difficult to stop, and may be also the economically best option of supporting a growing population under desperate resource pressure. However, this situation is breeding a new kind of individualism and differentiation, which it is important to take cognisance of. Some dimensions of this are structural inequality in access to arable land, the growth of a rural wage labour market (Adams 1987), the breakdown in access by the poor to the excess livestock of the rich, and the access of only the elite to essential credit for crop inputs. Furthermore, the reduction of the "commons" will also marginalise the poor in that they will probably suffer most as a result of the disappearance of such resources as "hush foods", firewood and building materials, leaf litter and termitaria soils for arable fertility inputs. As ideological commitment to "the commons" runs high in rural society, opposition to this trend may well be very considerable. Government policies and research in such areas would thus be wisely directed to consideration of equity issues.

Technical research and extension input in these areas might focus on such issues as fodder crop production, the sustenance of fertility with minimal applications of fertiliser (e.g. agro- forestry options), the potential for minimal tillage, and systems of operating mechanical tillage economically (section 5.5). The issue of co-operative groups (section 7.3) will be a complex one in this circumstance as there is going to be a considerable tension between the ideology of co-operation, which remains very strong, and the individualised process of production.

However, it must be emphasised that there is as yet little research relevant to this discussion in such areas, and that this should really be a priority before policy responses are designed. Such work is also needed for the planning of resettlement schemes in these regions. Cliffe (1986) suggests that Model A resettlement is simply not sufficiently intensive to make it a viable economic alternative to commercial farming in these regions. Therefore a similarly intense settlement and land use is required if the need to provide livelihood for people in this region is to be recognized.

Low potential regions: the need for more grazing land to support crop production

Our experience with natural region 4 and 5 areas in the central south suggests to us that the dynamics of arable expansion in these areas may be different. Due to lower population densities arable holdings are higher than in most of the higher potential areas. These arable areas are less than people would like to own and farm. Nevertheless most people are constrained from using all their arable due to shortages in livestock for

inputs. In this region of lower rainfall, winter ploughing and timely planting are all important, and stock holdings per unit arable need to be higher. Furthermore, fertiliser is basically unprofitable (Drinkwater 1987), and manure, termitaria soil, leaf litter etc. are used, and either require stock or draught power for carriage. Crop residues are extensively used to feed stock, but lower crop productivity, and longer dry seasons, mean that it will be very difficult to maintain stock in this manner. In these areas, overall productivity is seen as constrained more due to lack of commonage than lack of fields. Maintaining grazing lands seems essential, but there is no data available to assess whether cut backs in arable such as in Gutu and Mwenezi are actually raising overall productivity.

Assuming a given balance of arable and grazing creates maximal productivity, it must be realised that at such a balance, individuals will continue to want to take over the commonage. This is because the balance is only optimal for the average farmer. Resource rich farmers who can utilise larger arable areas, and land-poor individuals will both want to benefit from expanding their own arable at public cost. Further analytical models will need to be designed to answer the question of what the optimal balances of arable and grazing would be under different assumptions of productivity and ownership structure.

The population pressure in these dry central southern CLs is well known, and no technical options (bar irrigation) can really be claimed to offer the potential to increase their productivity at the rate necessary to continue to absorb population growth, let alone outstrip it. What should be recognised at the outset when discussing these areas is that their natural resource endowment is such that the official

government recommendation is that they should only be used for ranching. However, due to the very sensible adoption of limited input arable systems local people have found a way to produce grain, production of which is necessitated by the tremendous land use pressures experienced. This enables the adoption of a farming system many times more productive per unit area than commercial ranching, though of course, one which uses the environment more heavily, raises less foreign exchange, and limits the populations to variable and low incomes. Nevertheless, short of irrigation, there is no alternative method of land use available for supporting these populations in these marginal areas. Attempts to make them adopt modern commercial farming whilst modern commercial farmers in the same areas are advised not to use the same methods will either be ignored, or if adopted, lead to economic failures.

The development of these areas therefore must rely on the skills and resourcefulness of local people, with technical research adapting and improving the indigenous land use system. One clear option is to support the local interest in intensifying the use of patches of natural "wet land" (vleis and riverine areas). Such intensification, if carried out in an ecologically sustainable fashion, would increase production aiding to keep the pressure off the grazing land. In terms of economic return such innovations represent a more attractive proposition than conventional irrigation (Loughborough 1987), which should nevertheless also be encouraged.

As specified earlier, the constraint on increased cereal production in these semi-arid areas is essentially grazing commonage. This is well recognised by farmers, local officials

and Agritex staff in these areas. As Cliffe points out (1986:66), CL farmers are trying to solve this:

Some CL farmers pay "grazing rents" to neighbouring ranches to be allowed to have their cattle graze; others herd cattle on abandoned and unused land; they make proposals that government or local authorities buy ranches nearby for them to use; they send cattle to be "looked after" in other CLs or R.A.s [Resettlement Areas] with less severe grazing problems; they even club together to try to buy land.

Such grazing land purchasing initiatives are often very strong indeed in the areas we have worked (Drinkwater has studied one case in detail, pers. comm. 1988). The determination of people in this regard should be taken as reasonable evidence of its economic rationality. Such purchases of grazing areas to add on to existing CLs (ie. Model D), would be considerable more economic than the infra-structurally and administratively expensive Model A, which according to Cliffe cost Z\$25000 per family in natural region 5 (1986:67). They might well also show a higher return than money invested in grazing schemes in these areas. Magonya (1982:163) points out that such land purchases, pressed by the committee at Inyathi grazing scheme, would benefit the stock-owners more than the poor. This is true, but should be taken in the context of discussions in sections 6 and 7 about the nature of rural inequality. From this perspective what is important is that model D should not be developed as a beef production enterprise if equality is a consideration. This is because if this were followed the poor would not gain access to the stock for agricultural inputs and the "escape" to independent wealth described in section 7.5 facilitated.

9. GRAZING LAND MANAGEMENT

In this section we explore whether there are close associations between defined communities and particular grazing areas. Noting that these are weak, but may be growing, we examine the extent to which communities can agree and implement common management objectives.

9.1 "Wards" as the resource units in Shona regions

Due to research by Holleman "wards" (matunhu) have been accepted as the basic units of land management in "Shona" society (Holleman 1951:367-372; 1969:87-88). Holleman's involvement with the administration meant that wards became officially recognised. Considerable administrative effort was given to sorting out and re-institutionalising wards and chiefdoms (eg Holleman 1969:55-6; Hughes 1974). This was part of the effort to strengthen "tradition" in the face of nationalism and rural administrative breakdown. However there are problems in accepting wards as deeply rooted land management units. Attempts to delineate wards and chiefdoms generally ran into intractable disputes.

J D White (ex D C of Shabani [Zvishavane] District) spent several years investigating innumerable ward boundary claims and counterclaims, within the context of a detailed study of ruling lineage history and politics. He decided that the main reason for the confusion was the fact that there was no deep historical basis for the ownership of such territories. Nineteenth century Shona lived in large homesteads on defended kopje clusters, and farmed the vleis, around their bases. Though people had an interest in the large uninhabited "deve"

plains areas between the patches of hills, there had been no formal land boundaries within these zones.

Such a conclusion was also reached by the delineation team in Chivi (early 1960s), who observed that:

a chief's area could not normally be described geographically. It had no boundaries and might be described as "that area of land - indeterminate in extent - surrounding a particular hill/s occupied by persons loyal to the chief". It is only relatively recently that rivers and streams were employed to define areas - accelerated by the great increases in population (quoted in White 1974:174).

Concern for chiefly control of particular territories seems to have grown greatly during the colonial era. Following white settler conquest and the eviction of people from their strongholds the population rapidly spread out over these plains, and the "chiefs" moved quickly to gain political and spiritual jurisdiction over the land so as to try to maintain their authority. The Shona system of collateral inheritance of "chiefly" authority, whereby inheritance passed not from father to son, but from each man to the next most senior within the family, leads quickly to the situation of the proliferation of potential title holders. Due to descent from different wives or sons of the original patriarch, "houses" develop who may then start to compete. Quite quickly these disputes become insoluble. Generally, there thus emerged a growing set of minor "chiefs", who developed wards or sections of wards, as private chiefdoms. Not surprisingly neighbouring groups did not easily agree on boundaries. Wards have taken on many of the "functions" and attributes of chiefdoms, especially the religious-political dimension of land guardianship (Mukamuri 1987).

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It seems likely that the extent of wards as defined in the 1940s-60s by Holleman and the Native Department represented the particular degree of lineage fission at that particular time; coupled with limiting claims that no "house" could own a ward that did not exist as a political entity in the 1890s. What is happening now is that house differentiation within each ward is further sub-dividing them, but without a legal basis.

Coupled with this splitting process there is good evidence that the factional disputes within chiefdoms lead to realignments, creations and suppressions of "wards". This led Holleman to conclude:

In Mangwende Chiefdom the present ward divisions are therefore on the whole fairly recent creations (1969: 91).

Such changes were not unique (Holleman 1951:367). These adjustments in territory were also disrupted by administrative intervention. Chiefly ward territories has to be redefined and squeezed into Tribal Trust Lands (Hughes 1974). The administration backed certain chiefly factions against others, which led to preferential treatment in territorial allocation. European land use planning in the reserves and subsequent resettlement of the inhabitants has led to the re-designing of the ward boundaries, and they are clearly less defined today (Floyd 1959:59); Garbett 1963:195).

It seems, therefore, that discrete attachments of given communities to land is a function of a particular history whereby under colonialism chiefly authority was moved from being essentially direct and political, to being a more indirect authority through the control of land. The creation of such wards obviously involved dispute, and on-going lineage

fission and conflict meant that the boundaries have evolved and changed. The opportunity that they had to develop and stabilise as units of management was then hindered by continued administrative intervention in lineage disputes, and re-definitions due to hasty land use planning exercises. The instability of the boundedness of such entities contradicts the argument of Holleman that people therefore feel a permanent attachment and stake in them (1969:88).

Northern Zimbabwe is divided into political territories, often of quite ancient origin (e.g. Garbett 1977; Bourdillon 1982; Lan 1985). Many of these boundaries are not contiguous with those of present chiefs, and are represented by lion spirits through mediums. That these areas are clearly "territories" cannot be disputed, but detailed research has again showed that the territories are far from static (Garbett 1977). However, until resource use and dispute data is presented for such areas it really cannot be assessed whether or not ritual controls over the environment actually have a management orientation. For example, research on such institutions in the central south with B.B. Mukamuri show that in this area they do in regard to trees, but do not regulate grazing.

9.2 Are there exclusive territories for common property resource management?

Whilst wards are certainly considered by rural people (especially chiefly lineages), to be the administrative units of land, (even though they may change), this should not necessarily be taken as proof that they are natural or exclusive units of resource management. Holleman (1951: 359-60; 1969:88-9) himself noted that local lineage groupings

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developed their own mosaic of arable land rights within the ward, but always simply noted that non- arable areas: "were thus available for the reasonable requirements of all dunhu members for the purpose of grazing; and other natural resources - water, firewood, forest produce, honey, game, pot clay etc." (1969:89; see also 1951:369). Holleman refrained from providing any definite statement about whether the rights to communal resources were exclusive to that ward as a whole, and also whether there might also be a sub-division of such rights within a ward area.

Due to the large size of most wards common property resource use tends to be confined to areas adjacent to people's villages. This means that people have a "special interest" in neighbourhood rather than ward resources. Populations living on the ward or chiefly boundaries continue to use neighbourhood resources irrespective of the formal boundaries, though this can be the subject of dispute. While people live in what are defined politically as villages (ie. under previous sabhuku and present village development committees (VIDCOs), these are not in practise always areas of discrete settlement. In most areas settlement follows government defined "lines" of homes which merge between official villages. Sometimes distinct sections of residence exist within a "village". Individual homes, homestead clusters, spatially defined village sections, political villages and wider communities all therefore have overlapping rights of different strengths to any one natural resource in a specific place.

A recognition that there are such overlapping rights for communities at different scales does not mean that in each situation there are particular levels in the hierarchy that exercise particularly well recognised rights. What it does explain, though, is why these groups are not generally in a position to claim exclusive tenure. Livestock grazing areas are frequently described as belonging to certain loosely defined communities. In general these areas are approximately the grazing blocks tied to each section of the "line" of homes attached to the sabhuku. With time such association is being transferred to VIDCOs.

These areas largely coincide with the actual daily ranging patterns of herded livestock from those villages. However, the existence of such grazing areas does not mean that exclusive tenure is held over these pieces of land. Stock will necessarily need to pass through others' grazing lands, for example for dipping and water, and this right of access cannot be denied. Such access can pose considerable "problems"; the effects of heavy grazing and trampling around dip tanks are well known (Stocking, 1972; Zachrisson 198; 220). Areas with good supplies of water may be preferentially grazed by cattle from a variety of areas, especially during droughts. In Mazvihwa farmers in one such area have to respond by removing all the crop residues from their fields to ensure that their own stock will get them.

Attempts to control key resources: Small communities are often associated with "key resources". These include vleis and drainage lines, and sometimes areas of particularly good browse trees, such as Combretum apiculatum, which are lopped in times of drought. Drinkwater (1988, pers. comm.) has recorded in

detail how such community regulations in regard to key resources were capable of enhancing the capacity to survive the 1987 drought. We found similar situations, but noted that they remained hampered by the inability to achieve exclusivity of use. This is the main problem identified by the people concerned. In one case people tried to make official "laws" that they hoped would be enforceable. However, these attempts were seen to fail. Partly this was due to the compliance of local poor people who would happily take on the management of immigrant stock, even briefly, in exchange for the manure. However, even migrants with a lack of local contacts could still nevertheless obtain grazing without prosecution.

Existing grazing management regimes: We discovered no evidence for indigenous grazing management systems in our research areas, unlike in other African agropastoral systems. There remains though the possibility that burning control was instituted to obtain the right amounts of nutritious grasses at the right time. Extensive ethnographic and historical evidence exists for other parts of southern Africa that chiefly lineages were involved in burning control for the benefit of their communities (Hall 1984). One interview in Mazvihwa suggested that prior to the illegalization of burning by the state, similar controls had existed amongst southern Shona. He stated that this burning had also been to encourage grass against bush, and as part of pulsed grazing to limit tick infestation. However, burning disappeared as a major event in most southern areas by the early twenties, partly due to illegalisation, and partly due to the low dry season grass biomass that resulted from heavier grazing.

In most areas there were patches of sacred woodland (rambo-temwa), which, according to some accounts, could be grazed only under certain circumstances. These might be interpreted as part of grazing (and woodland) management, though it should be realised that they were essentially linked to religious dimensions of chiefly and land spirit authority, and contributed little in terms of actual grazing done.

Nearly all communities have an agreed rule that between certain dates during the rainy and harvesting season cattle must be herded and kept from damaging fields. After this cattle have the right to graze everywhere, including in the fields belonging to other people (e.g. Holleman 1952:13). This system is so widespread because of the valuable protection of crops that it gives, and because it allows for very little herding effort during the dry season, when cattle are usually allowed to roam freely. According to "tradition", the dates after which cattle must be herded, and the date after which they are allowed to go free are decided by headmen on behalf of chiefs. Within this period prosecution can occur for stray cattle damaging crops. However, that in practise there are frequently conflicts and confusions about such regulations. The most serious of these is the reluctance of leaders in some areas to impose herding early enough to protect the crops of people who wish to dry-plant or plant on first rainfall.

Why is there little indigenous grazing management?

The paucity of controlled grazing management schemes in colonial Zimbabwe is quite unusual compared to most African cattle keeping societies (see literature included in Scoones 1988). The reasons for this need to be discovered. We can

speculate that a number of different factors were involved.

In 9.3 it is shown that such grazing regimes were a feature of pre-colonial Zimbabwe. Their absence in the colonial era might therefore reflect the military destruction of the regional socio-political organisation necessary to manage land on such a scale. Furthermore, it could be argued that the intense and rather arbitrary state involvement in rural affairs throughout the colonial era effectively paralysed the growth of new institutions capable of implementing novel regimes. Whilst it is certainly true that indigenous African initiative was strangled by the Rhodesian regime it is nevertheless true that transhumance did survive in parts of Matabeleland (section 9.3).

An alternative explanation might lie in the argument that the economic and environmental circumstances of the Native reserves of Mashonaland were that there was little advantage of developing grazing regimes. The very local scale patchiness of the broken country which were allocated might not lend itself to large scale formal grazing regimes in the way that the floodplains in Matabeleland or the rift valley scarps do. Furthermore, dispersed settlement and the lack of potentially clearly defined territories may have been involved.

A final factor that may reflect the lack of local socio-political institutions capable of implementing such a controlled system of use. On the one hand chiefly authority had been undermined by conquest, but bolstered legally, such that commoners resented chiefly control and initiatives. Secondly the period was marked by rapid differentiation and growing inequality: big herd owners also often had very large

arable areas. Furthermore the successful farmers were often monopolising large portions of the key resources; for vleis and riverbank gardens. There was also a lot of migration and instability, not least due to the immigration of people thrown off "White" land. Perhaps the lack of social cohesion of common economic objectives was therefore responsible.

9.3 Managed transhumance and contemporary migration

Whilst it seems that nineteenth century Shona political institutions may not have developed territorial management of grazing to any particular extent, it remains rather an open question to what degree such institutions existed during earlier periods when Shona were more pastoralist and politically united, (c.f, Bhila 1971; Mudenge 1972, 1974), and possibly operated a pastoral transhumance system (Garlake 1978). Historical research has shown that the organisation of the Ndebele kingdom was to create a system for managing regional grazing, Cobbing wrote:

The essential aim of the tributary "system" ... was the establishment of a peaceful environment in which the cattle could be grazed in the outer regions of the Kingdom. It was for the Ndebele a form of *quasiveld* management whereby they were able to augment their cattle holding without destroying the grazing areas of the heartland (1976:148).

Cobbing emphasises the transhumance from the *sourveld* in the rains down to the *sweetveld* during the dry season. Judging from Cobbing, many of the south western "Shona" were not managing their grazing in the nineteenth century because the Ndebele were managing it for themselves, through a series of rather enforced alliances.

Little seems to be known about contemporary Ndebele grazing management systems, though we suspect that they may have much deeper historical roots than among southern "Shona", and possibly be quite significant. Certainly systems of transhumance have remained important, though nothing is known about whether these are continuations of nineteenth century practices or novel innovations (or some combination). Prescott describes them as follows:

The shortage of grazing land in the Reserves described has led the people to practise a form of transhumance (*lagisa*). In the southern sector of Nyamandlovu SNA the Nata river floods during the period January to April before draining south-westwards to Bechuanaland. After the floods have subsided the majority of the cattle from northern Nyamandlovu are brought into the valley, for winter grazing, by a number of selected families. The cattle graze there until immediately before the onset of the first rains, when they are driven back to their home kraals so that the herders can prepare their farms. A similar system is also practised by the people in Gwanda SNA "D", "E" and "F", who move their cattle into the recently flooded portions of the Shashani and Tuli valleys during winter. (1961:216).

This system impressed the Natural Resources Board, Native Enquiry in 1942 (p. 83-4), and they observed that it still went on in a number of districts. K. Billing (pers. comm. 1985) confirms that this is still occurring today in some of these areas. Such systems are clearly economically important strategies in response to a very spatially variable environment such as are found amongst most pastoral peoples. Land-use planning programmes ignore such migration imperatives at their peril. We would expect these systems to be built on sophisticated land tenure arrangements, though they may still involve unresolved conflicts.

Migration is an important means of coping with drought, even where institutions for managed transhumance do not exist (Scoones 1987; 1988b). This migration is centred on the fact that communities with better drought resource endowments are unable to prevent their use by incoming cattle. In a sense this is one of the advantages of communal resource tenure for overall system productivity: spatial fluctuations in resource quality can be responded to (Runge 1981; 1986).

9.4 Motivations towards more exclusive management of grazing commons

The costs of regulatory management may become worth bearing when the benefits of increased productivity through improved management are more valued. The costs of regulation include the costs of new regulatory institutions for rule-making and enforcement and the costs of loss of open access rights. Hughes (1974) has discussed at length the costs of restricting open access rights to communal resources in Zimbabwe. Significant productivity benefits are therefore required through communal management to make the transition worthwhile. There remain doubts as to the productivity benefits of rotational grazing patterns both among farmers and technicians (Theisen 1978). The benefits in terms of reduced herding labour are valued above this (Cousins 1987).

The greatest motivation for increased resource tenure under population pressure is the desire to secure preferential access in circumstances of land inequality. In these circumstances any community which has better than average common property resource endowments will have much to gain from obtaining exclusive rights. The "community" may be of any of the types

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described above. This has been seen with tree resources in deforested areas where communities with much woodland - eg because of adjacent mountains - have tried to exclude others. This has been opposed by local government (Wilson 1987). Similarly many grazing schemes are rooted in the efforts of communities to secure better than average grazing areas for themselves (eg Abel and Blaikie 1988:108-9). Not surprisingly the response of neighbours is to try to block the scheme or poach its grazing (Danckwerts 1974:56,60; Cousins 1987:48; Theisen 1978). Additional disputes may then evolve when scheme members use the scheme only as a reserve, continuing to graze their cattle outside until the commonage is depleted.

Variability in the extent of the grazing areas associated with each community reflect both inherited inequalities and different levels of invasion of arable lands into grazing. Differences are commonly considerable and lead to disputes about boundaries and exclusive rights because of the great economic significance of the resource. The causes of the differences are important as they shape the kinds of argument that occur when there is an attempt to alienate a specific area. In some areas people who have lost their grazing land to irrigation do not accept that they should lose their rights to graze adjacent grazing blocks, as they argue that these people also have plots on the irrigation. Furthermore, many grazing areas were encroached by immigrants settled in the area either semi-spontaneously, or through the colonial administration with the support of the chiefs. Therefore the ordinary farmers of such areas do not feel responsible for the loss of grazing land. Grazing schemes supporting such inequality in grazing commons access may lead to long term problems. State support

to privileged communities will be needed to prevent neighbours sabotaging the scheme. Scheme implementation may dry up when only resource-poor communities are left. Concentrations of stock may build up outside schemes which counteract any benefits of reduced stocking rates within. This is because neighbours' cattle will be constrained to small grazing areas, and because grazing scheme cattle may still be put into neighbouring commons to reserve paddock grazing. Furthermore, restrictions of stocking levels in grazing schemes could lead to the cattle being loaned to the poor of neighbouring communities.

Differentiation in grazing schemes: An interesting feature of grazing schemes is that they seem to be more effective at reconciling the objectives of rich and poor members than would be expected. Nevertheless conflicts do exist. As described in section 7.5 large stock owners in some areas can (and are?) using schemes to enable them to maintain larger herds under individual holding, going into a beef marketing enterprise. This is understandably resented by poorer members of the communities, and clearly by reducing arable inputs is reducing the capacity of CLs to produce food and sustain the bulk of the population. However as yet this situation seems not to be very common. One reason why those without stock are not opposing the schemes may be that they see them as a mechanism of maintaining the commons as a whole for the benefits of gathered foods and other communally held resources. Community level enclosure may present a lower cost to such people than if individual enclosure by expanded arable or individualised grazing was allowed to occur. Additionally, the present stockless are anxious that they too should acquire stock in the future and be able to gain access to graze them (Magonya

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1982:162). Most importantly they find themselves politically constrained by the fact that they are involved in draught-sharing relations with precisely the same big-owners who benefit from the scheme (see sections 6 and 7). One feature of these patron-client relationships is that whilst protecting and benefitting individual poor people they block effective common action by poor people as a whole. In certain circumstances it is large stock owners who oppose schemes. Theisen (1978) has described how before independence this resulted from a fear of de-stocking, and people remain suspicious and fearful about this to date.

9.5 Rural institutions for increasing grazing land management

In the preceding sections the many problems faced when attempting to increase grazing land management have been explored. Prior to instituting grazing regimes the issue of exclusive land rights has to be dealt with. Existing land rights involve a diffuse pattern of overlapping rights, including those of land spirits, chiefs, ward heads, village heads, local patrilineage heads and individual homesteads. Rights at any one level never fully exclude rights at another level. For example, just as a ward head cannot impose land use on an area immediately around an individual's home, an individual cannot use resources as s/he pleases within the ward as a whole. Additionally, horizontally overlapping rights exist between neighbouring homesteads, wards, chiefdoms etc. Mechanisms do not exist for defining boundaries and exclusivity of use between them. This lack of clarity of rights is further obscured by an ideology of individualism in resource use - the

right to subsistence - and the lack of will to use oppressive, punitive machinery to sanction others.

The growth of the parallel hierarchy of institutions - VIDCOs, WADCOS and Council, with attendant party structures, has not yet reached the point where existing rights have been taken over. There are huge regional differences in the degree to which these structures have gained effective power since their establishment in 1984. An uncertain and variable relationship exists between the two systems, often enhanced by the fact that single individuals hold a number of posts in both systems. VIDCOs are probably the best units for land management being more coincident with "special interest" neighbourhood land units managed by shallow lineage groups (see above). However they are demographically defined in terms of 100 households, rather than representing natural population units using a single block of resources who have a background experience of working together.

In addition to the range of "formal" rights to land described above, economic differentiation creates further interest groups within CLs. Although ameliorated by lineage clientage (section 7) this remains significant and is certainly an issue in representation on grazing committees which tend to be dominated by the economically privileged.

Some grazing schemes have survive for quite long periods without the overt support of the State or donor agencies (Magonya 1982; Cousins 1987). These demonstrate that grazing schemes can overcome the problems outlined above. The conditions for this remain unclear, but must combine the definition of suitable management units, the identification of

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the appropriate scale of organisation to be responsible for management, the resolution of conflicts over overlapping rights and the involvement of both rich and poor. In the light of the previous discussion the possibilities for this may be limited by the ability of new VIDCO/WADCO institutions to establish such resource control.

However, considerable experience is being gained in enhancing VIDCO resource management capacity. This includes water and woodland resource management projects in Zvishavane and Chivi Districts (Oxfam and ENDA-Zimbabwe supported local NGO projects). It is probably through carefully studied, practical experience of working alongside communities and rural institutions that the most effective ways of identifying and strengthening land management institutions will be found. The simple imposition of grazing schemes without detailed local planning involvement may prove a costly learning exercise, as has been the case in Botswana (Sweet 1987) and Kenya (Evangelou 1984).

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