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Iron age. Economics: herding, wealth and politics along the fringe of the Kalahari desert during the early iron age.

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speculations about the relationship between Toutswe and sites over 300 km distant in the Transvaal and Zimbabwe.

Conclusions

Though Toutswe has been known and written about for more than forty years, throughout most of this period, knowledge was based more upon speculation than excavation. Lepkonka’s work at Toutswe added little more than a synchronic description of ceramics to this picture. In order to comprehend the complex web of social, cultural, and economic processes which underlie the Toutswe Tradition, as it is expressed in material remains, a multi-variate approach is needed. This, in turn, requires that Toutswe be viewed not in isolation, but within a wider regional context of adaptation, interaction and exchange. In the next chapter economic models of herding and agricultural production will be developed which attempt to systematically relate variations in production systems to environmental and social considerations. These models form the theoretical framework for interpreting the information gathered during the course of reconnaissances and excavations in the Toutswe region.

CHAPTER 3

The Economics of Herding and Hoe Agriculture

In order to provide a framework which can reflect the possibilities and constraints underlying prehistoric decision-making along the edge of the Kalahari, this chapter will present ecological and economic models of the input-output relationships of herding and farming production systems in the region. Such models are helpful to an understanding of the potential flexibility of both contemporary and prehistoric production systems given varying biological, ecological, social and economic conditions. By examining the economics of subsistence production, one can thus begin to move away from typological characterizations of groups as “hunters,” “herders,” or “farmers” towards a more realistic assessment of variations in economic systems, the dynamics involved in the choice of particular ‘mixes’ of production strategies, and changes in these strategies through time.

Ecological models of herd growth will be discussed first in order to examine the conditions under which natural increases in herd size are possible, and how the biological parameters of herd growth are incorporated in decision-making processes. Inputs to herding, which is a capital intensive mode of production, will then be compared and contrasted with inputs to hoe agriculture, which is labor intensive. It will be seen that different cost-benefit relationships exist between herding and arable agriculture at different levels of
production. These dynamic relationships are in turn reflected in producers' decisions about how much to produce, and what proportion of household resources (land, labor, and capital) to allocate to each of these production processes through time.

The relationship between economic and social organization will be explored in the final section of the chapter to suggest that cattle do not function solely as a source of food in many southern African societies. In addition to their value as a source of meat, milk and hides, cattle also serve as a means of investment, as a hedge against drought and other risks, and as a symbol of social status and wealth. From this perspective, variations in the number of cattle owned by Iron Age groups take on a significance far above their importance as food.

**A Model of Herd Growth**

It has often been argued that traditional African pastoralism seeks to maximize herd growth in terms of numbers of animals, rather than productivity per acre or weight per beast (Schneider 1974; Sansom 1974; Dahl and Hjort 1976; Barker 1978). Such economies are thus expanding systems in which the dynamics of herd growth are a product of biological relationships between fertility, fecundity and mortality rates in a given environment. These biological variables are in turn related to the overall condition of the veld, as well as to other factors such as the incidence of disease and predators. Because off-take from herds is generally confined to non-reproductive animals (males and very old or sterile females) herd structures from different cultural traditions and from widely separated parts of Africa are often similar. For example, the Nuer in the Sudan (Evans-Pritchard 1940), the Pokot in Kenya (Schneider 1957), the Fulani in West Africa (Stenning 1957, 1959), the Ila and Tonga in Zambia (Colson 1951, Fielder 1973), and the Tswana in Botswana (Botswana Government 1981), all possess herds in which approximately two thirds of the animals normally consist of breeding cows and heifers. It can therefore be suggested that much of the variation in herd growth rates found in different parts of Africa are due to regional and local differences in ecological, rather than cultural, parameters of livestock production.

With regard to prehistoric pastoralists, it is generally accepted that cattle, goats and sheep were first introduced to southern Africa approximately 2000 years ago (cf. Sampson 1974; Phillipson 1977). This introduction is analogous to other, well studied, situations wherein a new species, whether domestic or wild, colonizes a new region. Figure 3.1 presents a typical pattern of population growth for such a situation (cf. Child 1971; Ricklefs 1979).

![Figure 3.1](image)
Because the number of new animals is initially low, crowding and depletion of resources do not hinder population growth and rapid increases in numbers often occur. When domesticated sheep were introduced to Tasmania in 1820, for example, the population increased from less than 200,000 to more than 2 million in 1850 (Davidson 1938). This tenfold increase in thirty years is equivalent to an annual rate of increase of 8%. Similar rapid growth rates are documented for Botswana after the Rinderpest Epidemic of 1896 when the national herd, estimated at approximately 125,000 in 1900, increased to almost 4 million over an eighty year period (Posbrooke 1973; van Vegten 1979). Since rapid increases in population size appear to be a relatively common colonization phenomena (Rickles 1979), these generalizations suggest that evidence for similar increases in herd sizes may be found for at least some Early Iron Age communities, particularly those in environments favorable to livestock production.

Because there is a feedback relationship between increasing herd size and the carrying capacity of a region, however, initial exponential rates of increase (A - B) cannot continue indefinitely. As animals begin to put pressure on available water and grazing resources, birth rates decline and mortality rates increase, slowing the rate of population growth (B - C). Numbers may then fluctuate within a narrower range related to local variations in climate, environment and food supply. After sheep became established in Tasmania, for instance, the population stabilized to vary irregularly between 1,230,000 and 2,250,000 head over the next one hundred years (Davidson 1938).

With increased population density, numbers may even begin to decline (C - D) as carrying capacities around water points are lowered through overgrazing and consequent replacement of the more palatable and nutritious grasses by woody shrubs. Figure 3.2, taken from Alidi (1979), illustrates such ecological changes around water sources in Botswana as a result of grazing pressure. Since most boreholes have only been in operation for 20-30 years, from an archaeological point of view this is a short term analysis and it can be expected that the area adversely affected will continue to expand in widening circles through time unless stock numbers are reduced.

Given that cattle must be watered every two to four days, the effective grazing area around water points is limited to a radius of between 12 and 20 kilometers (Dahl and Hjort 1976). This means that though large areas of relatively waterless range in a region may remain ungrazed, the adverse effects of local overgrazing around water points is critical. Even now, some cattleposts in the Kalahari have been abandoned not because the water supply has been exhausted, but because of the effects of overgrazing (Hitchcock 1978; O'Dell 1980).

Under traditional systems of livestock management in Botswana, the fixed costs to livestock production include variables such as the acquisition of access to grazing land, water rights, breeding
stock, and kraals, as well as variable costs such as labor for herding, milking and other chores. Though most labor supplies in traditional systems are obtained from within the extended family, these cannot be considered as 'cost free' since labor utilized for herding was necessarily taken away from alternative projects such as, for example, kaross making and hunting. In general, however, stock raising is not labor intensive and even under 'modern' management conditions it is recommended that one herder be provided for every 90 head of cattle (Ministry of Agriculture 1980).

In terms of the productivity of cattle raising, studies of traditional cattle posts in Botswana indicate that calving percentages average around 47% while calf mortality is about 10% (Ministry of Ag., 1980). To put these figures into perspective, if one owns a herd of 100 breeding cows, one can expect them to produce approximately 47 calves per year, of which ten will die from various causes. Roughly half of these calves will be females which will also begin to reproduce in about three years. In theory, over the long run this will result in increasing herd sizes until ecological constraints or increased off-take of breeding stock bring the herd into equilibrium.

Recent data from Mosolotsane, on the edge of the sandveld west of Shoshong, indicate that even higher rates of increase are possible for herds under traditional systems of management (Botswana Government 1981). Twenty year computer simulation models of herd growth using statistics gathered from closely monitored traditional herds over a
two year period indicate that a herd containing a total of 295 head (with 100 breeding cows) could expand to over 3330 head in twenty years time (see Figure 3.3a). Such high rates of increase reflect the fact that the veld in this area has not been heavily grazed and is in exceptionally good condition. Though these figures cannot be taken as average for eastern Botswana, they do indicate that it is possible for a family herd to increase to proportions requiring significant inputs of non-family labor within the space of a single human generation. As Sanford (1977: 45) noted, the rate of return to traditional herding systems in Botswana can be very favorable:

The owner of cattle on a cattle post can expect the number of his animals to grow at 7 or 8% per year, while he sells a further 8 or 9%. In very crude terms his potential offtake is about 15% per annum. Expressed as a rate of return to investment a traditional cattle-post owner can probably earn an inflation-indexed 10-12% on his money.

Computer simulations based upon data from the Bobonong area (see Fig. 3.3b), on the other hand, indicate that lower rates of increase can be expected as population densities increase and an area becomes overgrazed (Botswana Government 1981). Yet even with a drought built into the model at year 6, these figures still show a gradual increase, rather than a decrease, in herd size over a twenty year period.

The rapid rate of increase in animal populations documented since the turn of the century has resulted in serious overgrazing and consequent lowering of carrying capacities in many parts of the country (Campbell and Child 1971; van Vegten 1979; Botswana Government 1981).

Figure 3.3a: Herd projection, Mosolotsane area: 295 cattle (100 breeding cows).
The rate at which overgrazing can occur is especially significant if one considers that this has probably been delayed in many areas through the opening of new grazing lands in the Kalahari, areas only recently accessible because of the introduction of the borehole. At the same time, however, the rapid increases in herd size since 1900 and the production figures for traditional herds also indicate that the grasslands of the Kalahari and its margins are highly favorable for livestock production.

In conclusion, given that climatic and environmental conditions are not likely to have changed dramatically over the last 2000 years, these figures suggest that some Early Iron Age communities could have experienced similar rapid increases in herd size during the first millennium A.D. In addition, the exponential nature of such herd increases could have led to periods of rapid social and cultural change, followed by periods of relative stability. Once herd sizes had peaked, however, subsequent fluctuation in populations due to local overgrazing and drought may have led to a stabilization of herd numbers. The economic effects of such cycles may have been most strongly felt in more arid regions firstly because it is in these areas that livestock form a major means of overcoming crop failures, and secondly because such environments are especially sensitive to grazing pressure. Although rapid changes in social and cultural systems during the Iron Age have traditionally been attributed to contact with new cultural groups, these models suggest that internally generated economic changes may also occur rapidly to provide alternative reasons for socio-cultural change.

Figure 3.3b: Herd projection, Bobonong area. Initial herd structure: 295 cattle (100 breeding cows).
Models of Agricultural Production

In contrast with herding, hoe agriculture is a labor intensive venture, with outputs being proportional to labor rather than capital inputs. In most African societies, land was not individually owned, and access to the use of land was considered part of tribal membership (Gluckman 1955, 1971). In the absence of land scarcity, unequal agricultural production could therefore only be based on unequal access to labor. Since almost all households were engaged in agricultural production, this led to a peak labor season when every household was engaged in hoeing, planting, weeding and harvesting. In consequence, non-family labor was in short supply since payments would have to be measured against commensurate loss of production in one's own fields. Reciprocal work parties with meat or beer provided, polygyny, and slavery, were therefore the most common methods used to partially overcome peak-season labor demands. These constraints led Sansom (1974: 152) to contrast grain, as a 'commodity of equality,' with cattle in the following manner:

Investment in agriculture was investment in work. Cleared fields, recovered from the bush, were a capital asset. But cleared fields were exhausted after a number of seasons and, in any case, newly cleared land... was more fertile... Therefore, there is a fairly direct relationship between the amount of labor invested to the amount of grain that accrues to the producer.

Cattle, however, are unlike fields because the right to cattle and their increase vest in individuals and in production units. While returns from agriculture were a function of labor, returns from cattle were returns on capital investment. Cattle, as capital individually held, provide the means for spectacular discrepancies in wealth.

To better understand the differences between herding and grain production, let us first turn to economic models taken from Fisk and Shand (1969). These models can be used to illustrate the relationship between labor inputs and outputs for hoe agriculture and can provide a basis for comparison of the relative productivity of herding and agriculture along the margins of the Kalahari.

[Graph showing production curves 'a' and 'b' labeled 'Labor Input' and 'Agricultural Output.']

In Figure 3.6, above, production curves 'a' and 'b' represent relationships between levels of labor input (measured in man-hours) and levels of agricultural output (measured in bags or kilograms of grain). The slopes of the production curves differ, reflecting differences in the input-output relationships which could pertain, for example, between two separate crops such as sorghum and beans. Alternative production curves can also occur for the same crop when labor saving devices such as the plow are introduced, or when drought and decreasing soil fertility cause reductions in output. Such changes in input-output relationships mean that more labor must be expended for the same amount of food. If, for example, an output of 'x' bags of grain is required, the necessary man-hours of labor would be 'x' under curve 'a' and 'y' under curve 'b'.
Expanding upon this model, the relationship between production (supply) and human population size (demand) can be examined. In Figure 3.7 below the labor supply has been subjectively defined as the culturally determined maximum time a society is willing to allocate toward agriculture. This has been set at level L1. The amount of food needed to maintain a minimum nutritional level in the society is a function of population size. This has been set at point D in the model. Under production curve 'a', the society can satisfy its basic requirements by working less than the culturally defined maximum of L1, and still meet its nutritional needs by a level of production represented by point S1. This would result in what is known as a 'hidden' labor surplus of S1-D1, or a potential surplus of food D1-S2, if incentives for greater production are present. In other words, given the presence of internal or external markets for grain, production could be set at S2 without violating the norms of the society.

Under production curve 'b' a more difficult situation arises. Here the society's labor inputs cannot meet food demands, resulting in a food deficit of D1-S3, even though the society's labor force is totally utilized. Food must therefore be acquired from other sources such as herds, hunting or gathering if malnutrition and starvation are to be avoided. It follows that changes in input-output relationships due to drought or other causes can result in situations whereby in normal years a village has a food surplus, while in dry years, or as soil fertility diminishes, a food shortage occurs—even with increased labor inputs. In addition, diminishing returns to labor above certain thresholds result as larger and larger fields must be cleared, planted, weeded, and harvested if increased yields are required.

Traditionally, cultivation was carried out with a digging stick or hoe. With such implements, there is a limit to the amount of land which can be prepared by a laborer within a given period of time. In the eastern Kalahari, Hitchcock (1978: 351) found that average field sizes for people using digging sticks was 200 square meters, while hoed fields averaged around 2000 m² in extent, and plowed fields 57,000 m². These averages were obtained primarily from workers on cattleposts, however, and it is likely that the figures for digging stick and hoe agriculture do not accurately reflect field sizes in the past. In 1854 Moffat (1976), for example, observed that the Tswana in Shoshong:
... are not in want of food. You would be astonished to see the extent of their gardens... a plain between two ranges of hills with millions of acres as far as the eye can reach in west and east (in fact a total area of around 50,000 acres lies between the two ranges)... We... passed through extensive fields of native corn, some of which was unreaped from the abundance of the season.

Though Moffatt's figures for the number of acres under cultivation cannot be taken literally, the fact that grain was left unharvested in the fields suggests that it was sufficient for the population in the season he observed.

With the exception of Hitchcock's figures, reliable estimates for field sizes using hoe agriculture in Botswana are unavailable because the plow has been almost universally adopted since the turn of the century. Using the ox-drawn plow, field sizes averaging between 10-20 acres are consequently larger than the averages for hoed fields reported by Scudder (1961) and Richards (1939) from Zambia. Yields per acre, however, are relatively low in Botswana and most households harvest around one 90 kg bag of sorghum per acre (Hitchcock 1978; Jones 1979; Fox 1981; Gulbrandsen 1980).

In Zambia, Scudder (1961) found that the range of acres hoed by valley Tonga households ranged between 1.71 and 12.17, though the acres cultivated per gardener showed less variation, ranging from 1.71 to 3.09. Similarly Richards (1939) found that the average Bemba farm was about 3-4 acres, while the paramount chief's farms amounted to a total of 18 acres. In none of these areas do families produce grain at a level much above that needed for annual subsistence needs. Deficits due to drought or other causes are usually made up through purchases paid for by wage labor, cattle sales and beer brewing. Hunting and gathering of wild foods also plays an important role.

Relatively inefficient storage facilities and transport systems traditionally made it difficult for a surplus of grain to be accumulated over a series of years, or to be traded across wide areas. Hence, incentives were low for the production of crops much above a household's annual needs (Sansom 1974). Contemporary studies indicate that these same constraints are still important (Vierich 1979; Gulbrandsen 1980). Furthermore, those who did produce a substantial surplus were often suspected of having used supernatural means so that surplus grain was sometimes hidden "to avoid unpleasantness" (Martin 1903; Vierich, ibid.). These constraints suggest that variations in grain output per household were traditionally less than variations in animal holdings because, "Rights to land, labor relations, technical limitations, and the patterns of work... acted in concert to give grain its character as the commodity of equality rather than the capital of unequal ownership" (Sansom 1974: 157).

In the absence of other factors such as land scarcity, long distance trade, or unequal access to labor (including polygamy and slavery), it would seem that even in a hierarchical society such as the Bemba the possibilities for accruing wealth from hoe agriculture were limited. Richards (1950: 222), for example, commented that
among the Benba, "There is practically no inheritable wealth, either in the form of land, stock, or money, and this fact naturally influences the nature of their residence and kinship groups." Agricultural production therefore can be contrasted with herding where "spectacular discrepancies" in wealth are possible.

Herding and Agriculture in the Kalahari

Because crops are more sensitive than animals to drought or prolonged periods of low rainfall, the marginal return to agriculture relative to animal production is lower in more arid regions such as the fringes of the Kalahari. In addition, crops are dependent not only upon the total amount of precipitation, but also the timing of rainfall in a given year. A combination of late first rains with early frosts can result in crop failure even though total precipitation for the growing season is adequate. Livestock are far less sensitive to short-term droughts partly because they can be shifted from a drought area to areas where rains have fallen. In consequence, droughts affecting crop production in Botswana are far more frequent than droughts affecting livestock (Jones 1979).

The relationship between herding and agricultural production can be graphed as follows:

![Graph showing the relationship between herding and agriculture](image)

The production curve for herding has initially been set below that of agriculture because when herd size is small, drought, accidental death and other factors are more likely to upset the age and sex structure of the herd, resulting in lower rates of increase or even losses (Dahl and Hjort 1976; Fox 1981). As herd size increases, however, the probability that a herd will be wiped out by drought or accidental death decreases and the rate of herd growth can be expected to increase exponentially. Devitt (1979), for example, has suggested that for Botswana a 'critical herd size' of between 40-80 head is necessary before a herd is large enough to survive periodic droughts and still provide an off-take sufficient for subsistence and other needs.

On the lower end of the scale, herding and agriculture form complimentary systems since little additional labor is needed for tending stock. As both agricultural and animal production increase, however, tensions occur as herds begin to invade fields, destroy crops, and compete with agriculture for land and labor. Given the relative exchange and social values of grain and livestock, the curve for herding will ultimately surpass that of agriculture. As the value of potential off-take from herds increases, incentives for the allocation of additional capital and labor to stock raising rather than agriculture also increase and grain is more economically acquired through trade.

The response to relative differences in the productivity of farming and herding is predictable. Initially, as a small herd is accumulated, agricultural output rises because more oxen are available for use as draft animals (Dahl 1979). Above a level of approximately 80 head, however, agricultural output declines as households rely to a greater extent on their herds. Herd structure
also changes to include proportionately fewer oxen (used for plowing) and more breeding stock (Vierich 1979).

These models of subsistence activities suggest a fundamental contrast between herding, as a system of capital formation, and agriculture. In traditional African societies cattle often served as the 'big notes' of the economic system and were not raised solely, or perhaps even primarily, as a source of food (Schneider 1964). In southern Africa, a man's wealth was generally estimated by the size of his herd and institutions of economic dependency commonly developed which enabled a man to extend his authority over others by loaning out cattle. In addition, cattle in many ways acted as intermediary symbols linking families to one another, to the spiritual world, and to future generations. Cattle constituted the brideprice exchanged for a wife, her labor, and the right to all the children born. Cattle were the most important objects of sacrifice, linking men to the spiritual world. They were also important in rainmaking and rites of passage such as the final phase of bongura bobontso ('black initiation) among the Tswana when a pole, manyelakono ('that which the cattle excreted'), was erected in the chief's kraal (Schapera 1978). Even the layout of Southern Bantu homesteads and towns reflected the importance of herding, with family groups being arranged around central cattle enclosures (Kuper 1980). Because of their multiple values, demand for more and more cattle was inelastic and pastoralists are traditionally reluctant to decrease the absolute size of their herds in favor of higher quality animals.

In economic terms "inelastic" means that demand for a good or service does not vary with supply, but is constant. An "elastic" demand, on the other hand, indicates that desire for (or price of a good will increase or decrease depending upon supply.

Grain, on the other hand, was raised primarily for subsistence—though in some cases surpluses could be converted into cattle or other goods at conventional exchange rates (cf. Shapera 1938: 242; Hammond-Tooke 1962: 134; Sansom 1970: 157). On the whole, however, the constraints on agricultural production, combined with inadequate means for storage and transport, led to an elastic demand for grain. Few households, therefore, had much incentive to produce a surplus above what was needed for consumption, plus a necessary 'hedge' against drought or other risks. These contrasts between grain and animal production in Africa bear many similarities to the contrasting 'finalities' of economic systems posed by Sahlin's (1969;):

Livelihood and gain, 'production for use' and 'production for exchange' pose contrasting finalities of production . . . for one is an economic system of determinate and finite objectives while the other holds out the indefinite goal of 'as much as possible.'

The probability that herding economies will develop in a particular area thus depends upon an economic evaluation of the costs and benefits of alternative modes of production within a regional ecological context. Though the degree to which prehistoric economies may come to depend upon, or expand, livestock production is, in part, related to the carrying capacity of a region, it does not necessarily follow that herding economies are most likely to develop in areas with the highest potential carrying capacities. The cost-benefit relationships of herding, farming, and foraging must be considered together as a
single system. Shifts in emphasis between these three subsistence components depend upon the interplay of dynamic rather than fixed variables.

As population density increases, shifts from extensive to more intensive systems of land use (i.e., from herding to farming) may be necessary. In drought years, emphasis may shift back to herding and foraging. The relative costs of alternative modes of production are not separate and fixed, however, but inter-related. With the introduction of cattle, costs of a subsequent return to hunting and gathering are often increased as the density and variety of wild game and food plants in an area is lowered due to stock-keeping activities (Hitchcock 1978). Given these ecological changes, as returns to livestock decrease with overgrazing, it may not be economically feasible to return to foraging at a later point in time. In summary, it can be suggested that herding economies are more likely to develop in (as opposed to being pushed into) more arid environments because patterns of low rainfall, low population densities, and supplementary meat supplies from gregarious herds of game all act in concert to initially favor stock raising over alternative modes of production. Archaeological evidence from some parts of southern Africa indicates that both human and animal populations were on the increase towards the end of the first millennium a.d. (Fagan et al. 1969; Voigt 1980). Given the relative productivities of herding and agriculture along the edge of the Kalahari, it is expected that Iron Age groups in this area would have developed

more pastorally oriented economies than communities in higher rainfall areas further north and east. At the same time, it is ecologically unlikely that herd sizes would have reached a point where large segments of society could have become totally dependent upon pastoralism and begin to lead a semi-nomadic way of life. In the savannah woodlands of Central Africa, on the other hand, decreases in herd size may have occurred during the same period due to the prevalence of tsetse fly, resulting in an absence of pastoral societies in this region today.

In the long run, economic trends in southern Africa may have been cyclical as herds were introduced and rapidly expanded, only to be cut back as overgrazing, crowding and other factors came into play. Such fluctuations in wealth, stemming from internal changes in the ecological and social relations of production, may underlie other changes in socio-economic organization and interaction during the Iron Age. Since cattle, goats and sheep all reproduce at a faster rate than human populations, one can expect new social and economic institutions to develop to make use of the expanding economic potential these increasing herds could provide.

Economy and Social Structure

While the discussion has so far been focused on economy, this cannot be considered in isolation from its wider socio-cultural context. Decisions about what to produce are conditioned by a number of factors including the ecology of an area, disease vectors, rainfall, and the availability of capital and labor. Going beyond
this, however, variations in economic structure are reflected in other aspects of social life including marriage patterns, systems of land allocation and use, and alliance networks. Fundamental reorientations in the structure of exchange and other networks may occur as herds expand and contract.

A number of authors have pointed to important structural relationships between herding economies and socio-economic organization. Schneider (1974b) and Barth (1961), for example, have drawn attention to the independent nature of pastoral societies. Barth traced the reasons for this to the need to maintain a balance between the food requirements of a population and the need to preserve a critical herd size. This led to patterns of individual rather than collective control over productive resources:

A pastoral economy can only be maintained so long as there are no pressures on its practitioners to invade this large source of food. A pastoral population can therefore only reach a stable level if other effective population controls intervene before those of starvation and death-rate. A first requirement in such an adaptation is the presence of the patterns of private ownership of herds, and individual economic responsibility for each household. By these patterns, the population becomes fragmented with respect to economic activities, and economic factors can strike differentially, eliminating some members of the population (i.e. through sedentarization) without affecting other members of the same population. This would be impossible if the corporate organization with respect to political life, and pasture rights, were also relevant to economic responsibility and survival. (Barth 1961: 124)

In contrast with such 'specialized' pastoralism, most southern African societies combined arable agriculture with animal husbandry so that families who lost their herds through misfortune were not so much 'eliminated' from the system through sedentarization as limited from full participation in the spheres of life which required capital. In effect, they remained tied to the system through roles of subservience and dependency, while adding to the potential power of the owners of large herds.

On a more general level, Schneider (1974b) has suggested that pastoralism in Africa was not solely concerned with the production and conservation of a food supply, but also with the production of a fundamental medium of exchange and store of wealth. In other words, cattle function as a form of capital which circulates along and helps to define exchange networks. Schneider (1974: 274) then asked:

What evidence is there that pastoralists are more egalitarian than agriculturalists? ... I would not try to further defend this equation without a more intensive attempt to define egalitarianism and show how it does and does not relate to stratification. But the truth of the central hypothesis ... should be kept in mind. People who are wealthy are independent, and people who are poor tend to paternalistic dependence. Cattle are the most desired material wealth in pastoral societies; therefore, as a persons' cattle wealth increases he becomes more independent.

On the basis of work in East Africa, Schneider further postulated that the dynamics of pastoralism may have led to the development of 'business' cycles as herds expanded, but were cyclically cut back due to droughts and other ecological constraints. Once an expanding pastoral economy was established, it became increasingly more difficult for those without animals to maintain their independence by keeping up with the natural increases in herd size enjoyed by stock owners. In fact, the expanding differential between large owners and people with fewer or no cattle may have provided 'investment opportunities' for large owners to have acquired the labor, loyalty, support, and respect of clients through stock loans.
Another major area for 'investment' of livestock within traditional African economies is marriage. In a statistical study of bridedprice in Africa, Schneider found that there is a tendency for the size of bridewealth payments to be proportionate to the ratio of livestock to people (Schneider 1964). Furthermore, the size of the bridewealth payment appears to be related to the degree of rights transferred from the wife's to the husband's family until, "...at a level of around 50 head, complete control of the woman passes to her husband and divorce disappears" (Schneider 1974b: 263). Goody (1973) put forth a similar argument relating the transfer of wealth in Eurasia and Africa to particular forms of social structure:

The incidence of bridewealth decreases along a scale running from Patrilineal--Double Descent--Matrilineal--Bilateral Descent (p. 51) ... the relative size of payment is in a general sense linked with the quantum of rights transferred. In systems of matrilineal descent, where rights in a woman's procreative powers remain in the hands of her natal lineage, the amounts are comparatively less than in other societies (p. 3) ... Large bridewealth is primarily significant in (patrilineal) cattle-keeping societies of the savannas. It is of less importance (or absent) in matrilineal societies, which tend to be cattle-keeping. (p. 14)

These conclusions suggest that it may be useful to imagine patrilineal and matrilineal systems of social organization as points in a continuum along which societies will vary as they acquire increasing access to forms of wealth such as cattle; rather than as qualitatively different phenomena solely dependent upon the cultural traditions of the societies involved. It follows that matrilineal and patrilineal systems are not immutable 'types,' and varying degrees of adherence to 'rules' occurs within all societies.

Among contemporary 'patrilineal' groups such as the Shona and Tswana, marriages can be contracted with or without bridewealth payments, but in the latter case the degree of rights immediately transferred to the husband's family is also lower and residence initially matrilocality (Schapera 1938; Murdock 1959). In the 'matrilineal belt' of Central Africa, Richards (1950) has documented the importance of bridewealth transactions to the development of more patrilateral forms of social organization, and Lancaster (1971) has further shown how matrilineal forms of organization tend to break down with the introduction of cattle wealth. Thus, the ethnographic data indicate that wealth, particularly in the form of cattle, is highly correlated with increasing degrees of emphasis upon patrilateral forms of residence, kinship and descent. In addition, these studies underscore the situational basis of many aspects of social and economic organization.

It can be argued that underlying the structural relationships between herding and social organization are common value systems or cultural propositions which are shared by most Bantu-speaking peoples. Fluctuations in herd size due to ecological or other factors may then lead to alternative situations of action, encapsulated in the present as specific 'types' of social structure and economy. While the outcomes of such long-term processes are often difficult to document in the ethnographic present, they are of importance when considering the 1500 year time span of the Iron Age.

Prehistorically, one cannot afford to ignore the consequences of potential 'cycles' in the formation of social capital as herds were
built up and lost; resulting in the restructuring of the wealth and status of some groups relative to others through time. Such changes may have been expressed in a number of ways including, for example, the establishment of relationships of unequal social status and power, as well as in the development of increasingly diversified communities, both economically and socially, through time.

CHAPTER 4
The Environment of the Toutswe Region

Introduction
The Toutswe area was chosen for investigation because it lies along the edge of the Kalahari Desert close to the limits of potentially arable land. It is therefore a region where evidence for the development of prehistoric herding economies was theoretically expected. The study area included the headwaters of the Lotsane and Mahalatswe rivers which arise along an escarpment that forms a convenient boundary between the Kalahari Desert, or 'sandveld,' and the more dissected 'hardveld' lying to the east of the escarpment (Map 4:1). This chapter summarizes the present environment of the Toutswe region. Although it is not possible at this point to extrapolate with complete confidence from present climatic and environmental conditions to those which existed 1000 years ago, there is at present no evidence for dramatic climatic changes during this space of time (Grey and Cooke 1977; Cooke 1979b; Tyson 1979).

Topography
Toutsuwemogala lies in the hardveld approximately 45 km east of the Kalahari Escarpment. In places this escarpment is marked by a line of low, indistinct hills; in other areas vertical sandstone cliffs rise 30 meters above the lower-lying plain to the east. To the west of