

Coping with Uncertainty: Adaptive Responses to Drought and Livestock Disease in the Northern Kalahari

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Introduction

An enduring but in many ways unfortunate image of Africa is that of a malnourished child sitting in the sand at the edge of a refugee camp set in a bleak desert landscape. All too often, Africa is characterized as a kind of basket case, a continent beset by drought, famine, disease, and civil conflict (Kaplan 1996). Less attention tends to be paid in the media to African success stories, to the diverse and ingenious strategies used by communities, families, and individuals to cope with uncertainty and reduce risk, and to the innovative programmes employed by African governments and non-government organizations to predict, plan for, manage, and assess the impacts of changes in their socio-economic and environmental situations.

From the perspective of their residents, southern African countries are subjected relatively frequently to problems posed by drought, livestock disease, and other difficulties. For the purposes of this chapter, drought will be defined as a deficiency of precipitation that results in water shortage for some activity (e.g. plant growth) or for some group (e.g. farmers) (Wilhite and Glantz 1987: 13). Drought can also be viewed as a rainfall-induced shortage of some economic good such as grazing for livestock that is brought about by inadequate or badly timed rainfall (Sandford 1979: 34). Severe droughts, such as those of 1973-4 in the Sahel and 1961-5 in Botswana, can result in great hardship for local people and the animals with which they interact. If systems are in place that ensure efficient and effective response to drought-related problems, as was the case, for example, in Botswana in the 1970s and 1980s, the effects can be mitigated (Hay 1988).

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The Sahel drought of the early 1970s brought the problems of the semi-arid savanna zones of Africa and the status of pastoral nomad populations to international attention. There have been different interpretations of the causes of what some described as an environmental disaster. On the one hand, there were those who argued that a major factor in the drought was the behaviour of local pastoral and agricultural peoples who kept too many animals on the range and used destructive cropping practices on land that was held as common property. On the other hand, there were those who suggested that it was the actions of outside aid agencies that played a significant role in the deteriorating environmental and social conditions in the Sahel. Still others maintain that the Sahel drought and related problems were a result of a combination of climatic, social, economic, and political factors.

Besides drought, Africa has also had to contend with livestock disease problems, including rinderpest (known as *seakhuma* in Setswana), which wiped out a sizeable proportion of eastern and southern African domestic livestock and wildlife in the 1890s. The rinderpest epidemic of 1896–7 led to a downward economic spiral that affected sizeable numbers of people in eastern and southern Africa (Van Onselen 1972). Such losses were especially problematic because a fairly significant percentage of the population depended on livestock and wildlife for subsistence and income.

The impacts of livestock diseases in Africa were reduced over time, thanks to the application of immunization and animal health protection efforts of governments and international agencies. In the 1940s and 1950s a vaccine was developed to deal with rinderpest. The development of a recombinant vaccine for rinderpest led to a wide-ranging vaccination effort in the 1960s which helped control the disease (Dobson 1995: 487–8). Until recently, there had been less success in dealing with other livestock diseases prevalent in Africa.

Over the past decade, the impacts of livestock disease have become important topics of discussion among policy-makers, governments, and scientists, in part because of the outbreak of mad cow disease (Bovine Spongiform Encephalopathy, or BSE) in England in November 1986. BSE is a fatal brain disease of cattle. It is believed to be caused by a self-replicating protein, a prion (Prusiner 1997). A major reason for the tremendous concern relating to BSE was that it is potentially linked to a human disease, Creutzfeldt–Jakob Disease (CJD). The efforts to control the spread of mad cow disease had significant effects on cattle producers in England as well as the British economy in general (Cherfas 1990). The export of British beef to other countries in the European Union (EU), for example, was banned until 1 August 1999. Of a national cattle herd of 10 million in Britain, 188,000 cattle at risk or affected by BSE were killed, and the milk from potentially infected cattle had to be destroyed.

The United States Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) banned the import of live cattle and meat

products from BSE-affected countries after 1989. But the United States had its own livestock disease-related problems to contend with. In the Midwestern United States, notably in Nebraska and Iowa, people became sick from eating ground beef infected by *Escherichia coli* in 1997. Some 30 million people per year are affected by food-borne diseases, including *E. coli* in the United States (Center for Agricultural Research and Technology 1994). There are complex interrelationships between livestock disease and human disease which have led to calls for improvements in meat inspection and measures to control the spread of livestock disease.

Africa has long had to contend with a variety of livestock diseases, some of which have outbreaks that coincide with droughts. This was seen, for example, in the early 1900s and again in 1933, when Foot-and-Mouth Disease broke out at the same time as a major drought occurred in Botswana (Botswana National Archives—BNA—S.312/18, S.312/19, S.312/20). Droughts are frequent in the arid and semi-arid parts of southern Africa and occur in two years out of five. According to Sandford (1977), severe droughts can be expected in one out of every four to ten years in southern Africa.

The serious droughts of the 1982–5 and 1992–3 periods in southern Africa brought into sharp relief some of the problems facing local people. In some cases, people were unable to plough, and they were forced to find alternative means of producing food and generating income. Fairly sizeable numbers of livestock died, thus reducing the chances for rural households to gain cash through sales of cattle or smallstock. Wild plant foods and game were also depleted seriously, thus reducing opportunities for people to use resources that often served as fall-back goods in stress periods. In order to counteract these trends, Botswana and other southern African countries mounted drought and disaster relief programmes.

The Southern African Development Community has identified drought as a major constraint for people residing in the region's countries. SADC has also identified three major livestock diseases that have had major effects on countries in the SADC region in the latter part of the 1990s: (1) Foot-and-Mouth (Hoof-and-Mouth) Disease, (2) cattle lung sickness (Contagious Bovine Pleuropneumonia, or CBPP), and (3) Newcastle disease, a disease that affects poultry. In 1995, the SADC region had 44 million cattle, 36 million sheep, 25 million goats, 36 million pigs, 1.7 million horses and donkeys, and 102 million poultry (data from the Southern African Research and Documentation Centre, SARDC).

In February 1995 it was reported that there was an outbreak of Contagious Bovine Pleuropneumonia in the /Kaudum (Xaudum) Valley in the north-western Kalahari Desert region of Botswana. The government of Botswana moved quickly to cope with the crisis, mounting efforts to eradicate infected livestock in the district and implementing a disaster relief and livestock-owner compensation program. Botswana Department of Veterinary Services and Animal Health (DVSAH) and other government and

non-government personnel and soldiers from the Botswana Defence Force worked hard to contain the disease. Guards were posted hastily, and in at least one case a herd of cattle and its owner were stopped before the cattle could be taken across the Kuke veterinary cordon fence into the Ghanzi District.

As a means of preventing the spread of lung sickness, over 320,000 head of cattle were killed in Ngamiland in a relatively short period of time. In order to offset the effects of the cattle eradication, a program resembling the successful drought relief efforts of the Botswana government was implemented in northern Botswana, with some 44 million *pula* budgeted for the efforts (*Botswana Daily News*, 18 Nov. 1996, no 218: 1). Eventually, over 1.5 billion *pula* were expended on the livestock disease control and impact mitigation efforts. The reintroduction of livestock into the North West District began in April 1997, and was nearly completed at the time of writing this chapter. The losses of livestock due to eradication measures had significant socio-economic impacts on local people in Ngamiland and Botswana generally (Table 8.1).

This chapter addresses the efforts of the government and people of Botswana to cope with drought and outbreaks of livestock disease in the northern Kalahari Desert region. It outlines the ways in which drought and livestock disease-related relief activities have been implemented. The impacts of the 1977–8 Foot-and-Mouth Disease control efforts in Central and North West Districts are compared with those of the more recent Contagious Bovine Pleuropneumonia-related activities in Ngamiland. Particular attention is paid to the ways in which local populations in an environment some describe as marginal attempted to diversify their socio-economic systems in order to cope with changes brought about by drought, livestock disease, and the loss of access to livestock and livestock products.

Natural Resources and Livestock in Botswana

As is the case in many African countries, a sizeable proportion of the population of Botswana relies either directly or indirectly on natural resources to meet basic nutritional, economic, and social needs (Central Statistics Office 1976; Nteta, Hermans, and Jeskova 1997). Contemporary estimates indicate the contribution to the national economy of wildlife and other, non-domestic natural resources (e.g. fish, wild plant products) to stand at over P480,000,000 per annum (Ministry of Finance and Development Planning 1997). Soils and range resources are crucial to agriculture and livestock production, which together represent an important part of the economy of Botswana. While agriculture's share of the Gross Domestic Product (GDP) of Botswana declined from 42.7 per cent in 1966 to 4.1 per cent in 1994–5, agriculture

Table 8.1. Economic Contributions of Natural Resources in Botswana

Natural resources	Gross output (million <i>pula</i>)	Value added (million <i>pula</i>)	Employment (rounded)
Soils (for agriculture)	563.1	n.a.	84,000
Minerals (mining and quarrying)	4,859.0	n.a.	9,000
Rangeland (Grazing)			
Commercial	76.7	54.5	14,300
Freehold	17.7	0.4	1,200
Wildlife/Tourism			
Subsistence hunting	7.5–11.5	6.2	5,020
Photographic safaris	13.4	7.5	3,000
Hunting safaris	2.6	2.9	2,020
Game farming	0.1	n.a.	n.a.
Trade/processing	0.9	0.3	870
Hotels/tourism	1,839.9	n.a.	n.a.
Veld Products (Wild Plant)			
Subsistence	50.0	n.a.	n.a.
Commercial	4.4	2.2	100
Tourism-related	n.a.	n.a.	3,500
Fisheries			
Commercial	4.7	n.a.	900
Subsistence	2.6	n.a.	5,000–11,000
Forestry			
Commercial	4.7	n.a.	n.a.
Subsistence	2.6	n.a.	n.a.
Wood Fuels			
Urban	13.0	n.a.	400
Rural	16.6	n.a.	n.a.

Note: n.a. means not available. Figures are based on the most recent statistics available, 1995/6 and 1996/7.

Sources: The data in this table have been adapted from: Pearce, Barbier, and Markandya (1990: 158, Table 7.4); Harvey and Lewis (1990: 46, Table A3.1, and 76, Table 5.2); Pfotenhauer (1991); Nteta, Hermans, and Jeskova (1997); Ministry of Finance and Development Planning (1997); *National Accounts and Statistics Bulletins*, CSO.

continued to contribute significantly to the income and subsistence of many rural households (Harvey and Lewis 1990: 67–107).

The crucial variable affecting arable and livestock production in Botswana is rainfall. In general, the higher the rainfall the greater the biological production. There are other variables that also affect agriculture, including soil nutrients, pests, and disease. The Botswana Government and donor agencies have expended substantial sums in an effort to deal with these constraints. Sizeable sums have also been expended on dealing with the social and economic impacts of drought and livestock disease outbreaks (Sandford 1977; Hubbard 1986; Ministry of Finance and Development Planning 1997).

Livestock, and particularly cattle, play a variety of important roles in Botswana's economy and society, including serving as a kind of investment bank and providing a source of employment, food, and materials (e.g. hides for tanning). In 1980 exports of meat and meat products, live animals, and hides and skins brought in a total of P31,323,000. By 1995, these products earned a total of P217,913,000 (Ministry of Finance and Development Planning, 1997: 21). In 1994–5, the cattle industry accounted for 5 per cent of Botswana's exports, constituting 1.4 per cent of Botswana's Gross Domestic Product.

A major problem affecting livestock exports is the periodic outbreak of Foot-and-Mouth Disease, which has caused access to markets to be cut off, especially that of the European Union, an important one for Botswana beef (Hubbard 1986). Botswana has had the misfortune of having had cattle diseases affect the livestock industry as far back in time as records extend and presumably much longer (Falconer 1971*a, b*, 1972). Although Falconer (1971*b*: 74) maintains that there is no official record of animal disease in the Bechuanaland Protectorate prior to 1905, there are references to the 1896 rinderpest epidemic in the Botswana National Archives (see BNA file RC.3/2/1). The impacts of the rinderpest epidemic of 1896–7 were so severe that people in the major towns and villages of Botswana were forced to hunt and gather for their subsistence. Some of the people left the country, bound for the mines of South Africa. Others sold off their assets to raise cash with which to purchase food and other necessities.

Fear of the spread of rinderpest, which came from the north, led Bechuanaland Protectorate officials to erect one of the first veterinary control fences in Botswana, an east–west trending fence erected in the eastern part of the country, but by November 1896 rinderpest had spread to the southern borders of the country. In 1904 there was a threat of East Coast Fever near the borders of Bechuanaland, and a veterinarian was loaned to the Protectorate Administration in case it spread further. The first local veterinarian in Botswana was appointed in March 1905 (Jack Falconer, pers. comm. 1978).

One of the more serious outbreaks of FMD in the country was in 1933. Prior to that time, in 1931, there had been an outbreak in what was then Southern Rhodesia (now Zimbabwe) which was controlled by using an intranasal inoculation of virulent blood. This method, pioneered by a veterinarian named Bevan, was employed as a means of infecting susceptible cattle and in such a way building up their immunity to more virulent forms of the disease. A method not unlike that used by Bevan, known as apthization, was later used in Bechuanaland. This method consisted of using the material collected from the lesions on the tongue and feet, straining it, mixing it with a solution of glucose and penicillin and then injecting it into the animals. There was some question as to the efficacy of this procedure, as there was a chance that other animals in the area might become infected. This turned out to be the case when, in 1957, FMD broke out in southern

Botswana near an area where cattle had been heavily treated using apthization (Falconer 1972: 358). Because of the possibility of FMD spreading, it was decided in the early 1960s to use a system of annual prophylactic vaccinations; a serum for FMD that had been developed by the Animal Virus Research Institute at Pirbright, United Kingdom. Prior to 1948 it had not been known that the Southern African Type (SAT) strains of FMD were different from other strains, but once that was learned it was only a matter of time before a vaccine could be developed. The year 1965 saw the beginning of annual vaccinations of cattle against FMD.

An examination of data on FMD and other disease outbreaks indicates that they occur in Botswana every few years (see Table 8.2). The majority of the outbreaks have been in the northern part of the country, primarily in the Okavango, Chobe, Botletle, and Makgadikgadi areas. The incidence of FMD

Table 8.2. Livestock Disease Outbreaks in Botswana

Year(s)	Livestock Disease	Location	Reference(s)
1896–7	Rinderpest	Entire country	BNA RC.3/2/1
1933	Foot-and-Mouth	Entire country	BNA S.380/3, S.308/4, S.312/9
1934	Foot-and-Mouth	Botletle River, Central and Southern Districts	BNA 2/312/18, S.312/19, S.312/20
1937	Foot-and-Mouth	Palapye, Central Botswana	BNA S.471/4; Falconer (1971 <i>b</i> : 75)
1944	Foot-and-Mouth	Northern Botswana	BNA S.230/8/1–2
1947–9	Foot-and-Mouth	Northern Botswana	BNA S.230/9/1–4, S.231/1/1–6
1950	Foot-and-Mouth	Chobe	Hedger (1968)
1957	Foot-and-Mouth	Southern Botswana	Falconer (1971 <i>a</i> : 154, 1971 <i>b</i> : 77, 1972: 358)
1958	Foot-and-Mouth	Ngamiland	Falconer (1971 <i>a</i> : 154, 1971 <i>b</i> : 77)
1960–61	Foot-and-Mouth	Northern Botswana	Falconer (1971 <i>a</i> : 154, 1971 <i>b</i> : 77)
1963	Foot-and-Mouth	Motopi, Botletle River area	Falconer (1971 <i>a</i> : 154, 1971 <i>b</i> : 77–8, 1972: 357)
1964	Foot-and-Mouth	Ngamiland	Falconer (1971 <i>a</i> : 155, 1971 <i>b</i> : 78, 1972: 357)
1965	Foot-and-Mouth	Central Makgadikgadi	Falconer (1971 <i>a</i> : 155, 1972: 350)
1968	Foot-and-Mouth	Chobe	Falconer (1971 <i>a</i> : 155, 1972: 354, 358)
1977–8	Foot-and-Mouth	Ngamiland and Central District	Falconer (1980), Hubbard (1986)
1995–6	CBPP (lung sickness)	Ngamiland	Ministry of Agriculture (1996)

Note: BNA stands for Botswana National Archives; the number following (e.g. S.308/3) is the reference file number used in the National Archives filing system.

in these areas must be, it was reasoned, associated with a common ecological factor. Looking at animals present in these areas, it was decided that buffalo were likely to be the species responsible for carrying the disease. Accordingly, the Department of Animal Health set about sampling a number of buffalo in an attempt to test this hypothesis (Falconer and Child 1975; Drager, Patterson, and Breton 1976). It was learned that buffalo carried three types of virus, known as South Africa Types I, II, and III. Prior to this time, no outbreaks of SAT II had been known to occur in domestic stock. It was not until the outbreak in 1977 that SAT II was positively identified as being responsible for the FMD occurrence in domestic animals.

There is some question in the minds of a number of people whether wild species of game really are responsible for the outbreak of FMD in cattle in Botswana, but there is no doubt that tests run on animals, and not only buffalo, have shown there to be lesions and high levels of immunity, indicating infection with FMD (Condy, Herniman, and Hedger 1969; Condy and Hedger 1974). After vaccination of the cattle herds in the Central District affected zone it was realized that the vaccine was not as effective against SAT II as it needed to be. The result was an inability to control FMD completely. The cordon fence system and the patrols, however, managed to contain the disease, so cattle from the northern part of the country could still be sold to the Lobatse Abattoir. But the outbreak resulted in a decrease of livestock sales throughout the country and a loss of millions of *pula* that Botswana might otherwise have had. The threat of outbreak of FMD was recognized by the Department of Animal Health, and a project was written to extend the cordon fence system and to make the existing cordon fences smallstock-proof. The National Development Plan VI, 1976-81 (Ministry of Finance and Development Planning 1977) included a project (AH 12) to control FMD through an extension of the fences, because the government had realized that the vaccines had ceased to be as effective as formerly. One of the problems of expanded fencing was that it not only prevented livestock movement but also the movement of game animals, especially migratory ones. Falconer (1972: 356) maintained that game changes its movement patterns away from the fences so that they are not affected, a position that was challenged by other researchers (Owens and Owens 1981, 1984; Hobbs 1981).

It is interesting to note that the Central Ngwato fence, reputedly patrolled daily in 1978, was found to have long sections lying on the ground, and cattle were moving freely back and forth across it even after the ban on livestock movement was declared and the fences supposedly strengthened. When the author reported this fact to government authorities, they claimed that this breakage was due to 'a huge herd of eland, ranging in size from 400 to 1,000 animals'. Over two years of fieldwork in the region, no more than a maximum of 70 eland in a herd were observed, and no animals were seen near the fence in the period from October 1977, when FMD was first declared, to April 1978. Yet workers for the Veterinary Department went into the area and shot

dozens of eland. It is open to question whether elands or other game animals were actually responsible for the condition of the fences or whether they were in poor shape because of a lack of maintenance.

The impact of the 1977 FMD outbreak was all the more serious when viewed from a historical perspective. Botswana, plagued by periodic droughts (some of the most serious in the past few decades being those of 1933, 1947, and 1961-5, which, interestingly enough, correlate with FMD outbreaks), had a run of several years of abundant rains in the 1970s. This fact, coupled with favourable world beef prices and expanded veterinary and agricultural extension assistance, meant a tremendous increase in the size of the national herd to its largest number in history, something over 3 million head. At the same time there was a corresponding increase in the number of watering-points in the sandveld areas especially in the period following 1965 when 'Drought Relief Boreholes' were drilled. Many of these new boreholes were in the vicinity of the Makoba (Central Ngwato) quarantine fence (see Hitchcock, 1978: 161, fig. 6.3).

The 1970s saw a rapid increase in borehole drilling, in spite of the 1973 borehole freeze which was instituted prior to the launching of the Tribal Grazing Land Policy (TGLP) in 1975 (Republic of Botswana 1975) (for a discussion of this point, see Hitchcock 1978; Peters 1994). The additional watering-points resulted in an expansion of cattle further west in the country, including into the western parts of Central District, western and north-eastern Kweneng District, western Southern (Ngwaketse) District, north-western Kgalagadi District, southern Ghanzi District, and the South Ngami area of North West District.

There was a direct income loss to cattle-owners in Ngamiland and the northern part of Central District, as well as in the buffering areas of South Central District, and Ghanzi District. When the Lobatse Abattoir opened, only cattle from the Kweneng, Kgatleng, Kgalagadi, and Southern (Ngwaketse) Districts were taken. Central District was undoubtedly the hardest hit. In an analysis of the income effects of FMD, Mauco (1978) indicated that the only people who were directly affected by the disease were the wealthy or say 25 per cent, not the lowest 45 per cent who according to the Rural Income Distribution Survey (RIDS) own no cattle (Central Statistics Office 1976). He also noted that 'even the poorest households own lands'. Mauco went on to argue that 'the extent to which non-cattle owners will bear the loss (I contend) is minimal and depends on the Income Source Ranking of the lowest income group'.

Mauco's assessment was based on the results of the Rural Income Distribution Survey (Central Statistics Office 1976), which maintained that 45 per cent of the people in Botswana owned no cattle. However, a distinction must be drawn between 'owning' cattle and holding cattle. Many people have the use of cattle, for example as draft power or milk sources, while not actually owning them. The *mafisa* system is one in which individuals have the use of

cattle over a period of time and essentially herd them themselves, getting the benefits of the meat, milk, and transport power. At the same time, many people borrow or hire cattle to use in their fields. While RIDS emphasized owning, the Agricultural Surveys of the Ministry of Agriculture (e.g. those conducted in 1970-1 and 1972 by the Agricultural Statistics Unit) stressed holding of cattle. A more realistic figure of those who did not have access to cattle was probably around 30-35 per cent.

Thus, the questions that need to be considered are: (1) what effects did the FMD outbreak have on those who did not own cattle? (2) what effects did the FMD outbreak have on those who did not hold cattle? and (3) what effects did the FMD outbreak have on non-stock-owners and non-stockholders (e.g. employees of cattleposts who have no livestock or *mafisa* holdings of their own, and dependents of those who work on cattleposts)?

The Rural Sociology Unit (now, the Socio-economic Monitoring and Evaluation Unit) in the Ministry of Agriculture was requested in early 1978 to carry out a survey of the effects of FMD in the Central and Ngamiland Districts. These surveys were carried out in January and February 1978, and two reports were produced (Ntseane 1978; Merafe 1978). In contrast to the view that FMD had minimal effects, these investigations indicated that the outbreak had drastic effects, particularly on the poorer sectors of the population. The ban on the movement of cattle, for one thing, meant that many of those people who had yet to plough their fields were unable to do so, since the cattle could not be taken from the cattleposts to the lands. Second, there was a general movement away from the villages to the cattleposts so that people could get access to milk which could not be transported from the cattleposts to the villages. This movement also resulted in a depopulation of the schools.

The economic effects of the outbreak included a reduction of incomes for people in the Ngamiland and Central District villages. People who made their money through the manufacture of beer or crafts had a hard time making sufficient sales. There was also a loss of employment related to the FMD outbreak, since store-owners and other employers cut back on their help. Even transport was affected; many people in rural areas move from one place to another by donkey, and with the ban on animal movement this strategy was no longer allowed.

Yet another problem identified in Ntseane's and Merafe's surveys related to purchasing and credit. People were forced to buy goods from stores since they could not get access to milk and meat. There were two problems with this strategy; first, the stores had little in the way of stocks, partly because of the tight money situation and partly because of the poor road conditions brought on by heavy rains. Second, since people had no money with which to purchase goods, they had to ask for credit, but generally the store-owners, hard-pressed themselves, refused to extend it to them.

In 1977-8 there were two opposing views in Botswana on the effects of

FMD. One view held that FMD was affecting only the wealthy, since it was they who owned the cattle and could not sell them. The other perspective was that the FMD outbreak was affecting everyone in the country, particularly the poor. Prices for goods increased, and thus people's purchasing power was reduced. Some of the people employed on cattleposts in the Western Sandveld region of Central District found themselves out of a job, or alternatively they were not paid for their work nor given food (Hitchcock 1978). One of the responses to this situation was that people resorted to alternative ways of making a living, including expanding their dependence on wild plant and animal foods, a strategy similar to that seen in drought periods in Botswana.

FMD, far from having a 'minimal' effect on the poorer sectors of Botswana's population in 1977-8, had a very marked effect. This was the case in the villages examined by Ntseane (1978) and Merafe (1978) and cattleposts in two of the commercial areas, the Western Sandveld of Central District and Lepasha, the Second Development Area (SDA) to the east of Sua Pan in Central District. In both of the commercial areas it was found that people suffered from the effects of the disease, particularly in terms of diminution of cash income, loss of employment, and lack of access to subsistence sources (such as milk, for example). The removal of cattle from cattleposts in the Western Central District and Lepasha to the quarantine camps at Makoba and Dukwe resulted in a loss of access to milk and draft power for cattlepost residents.

Employment opportunities for herders (*badisa*) declined in both the Western Sandveld and Lepasha areas, with the numbers of jobs being reduced on average by one-third to a half (Hitchcock, field data). While some people were able to obtain employment as fence guards, this did not make up for the loss of jobs for local people. The reason for this situation was that most of the fence guards who were interviewed in 1978 had come from outside the immediate area, mostly from the north or the west, from Mosu and Rakops, for example. Thus, there was competition for jobs in the areas affected by Foot-and-Mouth, something that exacerbated social tensions.

Because there was no off-take of livestock for sale, cattle-owners held back on the payment of their employees, and the people on the cattleposts said that they suffered greatly as a result. The one advantage of FMD to the local people in the Western Sandveld and Lepasha regions was that it meant that they could eat all the meat of a dead animal, something they were not able to do previously since they were obligated to take the meat of the animal to the owners, most of whom lived in villages outside the commercial zone. A number of cattlepost employees mentioned that this increased access to the meat of dead livestock was the one benefit that came out of the FMD situation.

The people on the cattleposts suffered other consequences as a result of the government rules about actions that were not allowed in the affected areas. There was punishment meted out by fence guards to individuals who

took their animals too close to the cordon fences or who carried meat or milk across fences. There was also stepped-up monitoring of rural areas by Department of Wildlife and National Parks and Department of Animal Health personnel, and one result was an increase in the number of arrests of people for contravening the ban of hunting and moving of animal products (both domestic and wild).

It is ironic that while there was a ban on hunting by local people, this was not the case for the veterinary teams, who had the right to shoot any animals that they considered a threat to the veterinary cordon fences or to the cattle in the affected areas. During fieldwork in 1978, scenes were witnessed where at least a dozen eland and hartebeest had been killed by veterinary teams and the only parts taken from them were the livers. When it was pointed out to the Department of Animal Health workers that the taking of livers across cordon fences was illegal, they said that they had government permission to do so, something that remains unconfirmed.

The hunting ban not only had an effect on local nutrition but also on the relationships between local people and government officials, which deteriorated rapidly, especially in the areas close to the veterinary cordon fences where people were arrested for crossing the fence after allegedly procuring game meat. These tensions were especially obvious in confrontations between groups of local people and game scouts that sometimes resulted in physical altercations.

Yet another effect of the FMD outbreak was that the borehole pumps were turned off by owners as a means of saving money on diesel. The borehole engine at Uwe-Abo (Central District, see Ch. 5), for example, was turned off when the cattle were taken to the Makoba Quarantine Camp in January, 1978. This situation caused local people to go thirsty. Some of the people in the Western Sandveld resorted to exploiting roots or melons (e.g. *Citrullus lanatus*) (Hitchcock 1978). The problem was that the presence of large numbers of cattle had resulted in a serious reduction in the availability of melons and plants with large moisture-bearing roots. There was also increased competition between people from villages and lands areas with those residents of cattlepost areas for wild plant resources. The result was increased hardship for those groups who relied on wild resources for moisture, food, medicines, and income.

There are a number of conclusions that can be drawn from the assessment of the 1977-8 FMD outbreak impacts. The declaration of FMD had substantial effects on the poorer sectors of Botswana's population not only in the towns and villages but also in the cattlepost areas. These effects included: (1) the loss of employment; (2) the loss or reduction of payments for labour; (3) the reduction in subsistence resource availability as a result of the cattle being moved to the quarantine camp and the ban on moving milk and other livestock products; (4) the loss of draft power and the consequent inability for people to plough, resulting in a reduction in field sizes and agricultural

yields; (5) the loss of the opportunity to sell cattle for income-generating purposes; (6) the loss of access to water in some cases; (7) the failure of credit being extended to people by trading store owners; (8) an increase in prices for goods; (9) a reduction in school attendance; and (10) the increased rates of arrest of people for breaking rules concerning moving livestock products, herding cattle too close to a veterinary cordon fence, and hunting. Overall, the quality of life for people on cattleposts, in lands areas and in villages, declined as a result of the FMD outbreak of 1977-8.

The Botswana government initiated a relief operation that included what was known as the P50 Scheme, in which individuals were able to get credit through the Co-operatives and the Botswana Livestock Development Corporation (BLDC). The government also abolished payment of primary school fees in all the affected areas, while payment of secondary school fees was deferred. The loan scheme, while considered by some to be too little too late, was instrumental in providing cash for purchases of food and other goods at the local level. Some people were able to pay off part of their National Development Bank loans with the money that they received, while others were able to take care of some or all of their outstanding debts with local traders. The problem with the scheme was that it was set up initially to provide credit to people who had cattle already; thus, those who did not own cattle were not able to benefit directly from it. There was also a stipulation that the loan would be made only to those who could pledge oxen as collateral; those who had heifers felt that they were left out (Merafe 1978).

The P50 Scheme was viewed by local people as being inequitable because it provided support to cattle-owners and not to either arable farmers or non-stock-owners. Overall, the scheme was useful in the eyes of those who received funds but even they had their reservations about the amounts of money made available. The other issue that local people had with the scheme was that the implementation by the BLDC and the co-operatives was not as effective as it might have been. They felt that other institutions in government, including the District Councils and the Remote Area Development Programme, should also be involved (Yvonne Merafe, pers. comm. 1978). There should be greater co-ordination and co-operation among government- and district-level organizations, and communities should be allowed to have a greater say in the planning and decision-making process.

Dealing with the CBPP Outbreak in Ngamiland

The relief operations that Botswana has mounted in the past to deal with drought and livestock disease outbreaks have generally been viewed as quite effective. From the standpoint of those who had no cattle or those who were working on cattleposts, however, the programs were seen as largely aimed at the better-off sectors of the population. The erection of fences was seen by

some people as being a useful way to prevent the spread of livestock disease, but they were also perceived as being harmful to wildlife (Hobbs 1981; Owens and Owens 1981, 1984; Albertson 1998).

After the presence of CBPP was confirmed in 1995, wide-ranging vaccination campaigns were employed using TI-SR CBPP vaccine produced by the Botswana Vaccine Institute (BVI). Guards were posted along fences in order to prevent movement of livestock and livestock products. Plans to allow the repatriation of Herero livestock from Ngamiland to Namibia were shelved. A major difference between the 1977–8 FMD outbreak and the CBPP outbreak of 1995 was that in the latter case, the Botswana government opted to kill all the cattle, regardless of whether or not they were infected with the disease. Also, a much more concerted effort was made to provide timely cash and in-kind compensation to those who lost cattle.

Some of the impacts of the CBPP campaign and relief efforts in Ngamiland can be seen in the case of /Xai/Xai (Cgae Cgae), a community of some 388 people in the western remote zone of the district, next to the Botswana–Namibia border (see Figs. 8.1 and 8.2). At the time the decision was taken by the government of Botswana to dispatch all the cattle in the district to halt the spread of CBPP, there were several hundred cattle at /Xai/Xai. Cattle-ownership was skewed, with only a third (36%) of the households having cattle of their own. The cattle were grazed in areas that have now been designated as Community-Controlled Hunting Areas (CCHAs) NG 4 and NG 5, which together cover an area of 16,966 km². Some of the people from /Xai/Xai worked at a nearby cattlepost, Xhaba (Botshelong), where there were over 1,000 head of cattle at one stage in the early to mid-1990s. Overall, in 1991, there were some 21,000 cattle in western Ngamiland, a figure based on an assessment of numbers of animals vaccinated for FMD (Smit and Kappe 1992: 30).

By mid-1996, there were no cattle left in western Ngamiland, the herds having been eradicated by teams made up of government workers including people drawn from the Botswana Defence Force, the Ministry of Agriculture, and the North West District Council. After the cattle were killed, people at /Xai/Xai diversified their strategies. Some of them engaged more intensively in foraging for wild foods, especially wild plant foods such as *morama* (*Tylosema esculenta*) and *mongongo* (*mokongwa*, *Riciodendron rautanenii*). There were also people who opted to engage more extensively in craft production and sale, making bead necklaces and leather carrying bags.

Other economic activities that people pursued at /Xai/Xai included hunting both for subsistence and for commercial purposes, with some people selling hunting products to local buyers, to tour groups that visited the area, and to the Botswana Defence Force soldiers who were patrolling the border. A number of the residents of /Xai/Xai joined a craft organization, !Kokoro Crafts, which in 1995–6 earned P13,500. Approximately twenty people took part in eco-tourism activities with !Kokoro Safaris, earning some P8,000 (Ruigrok 1997).

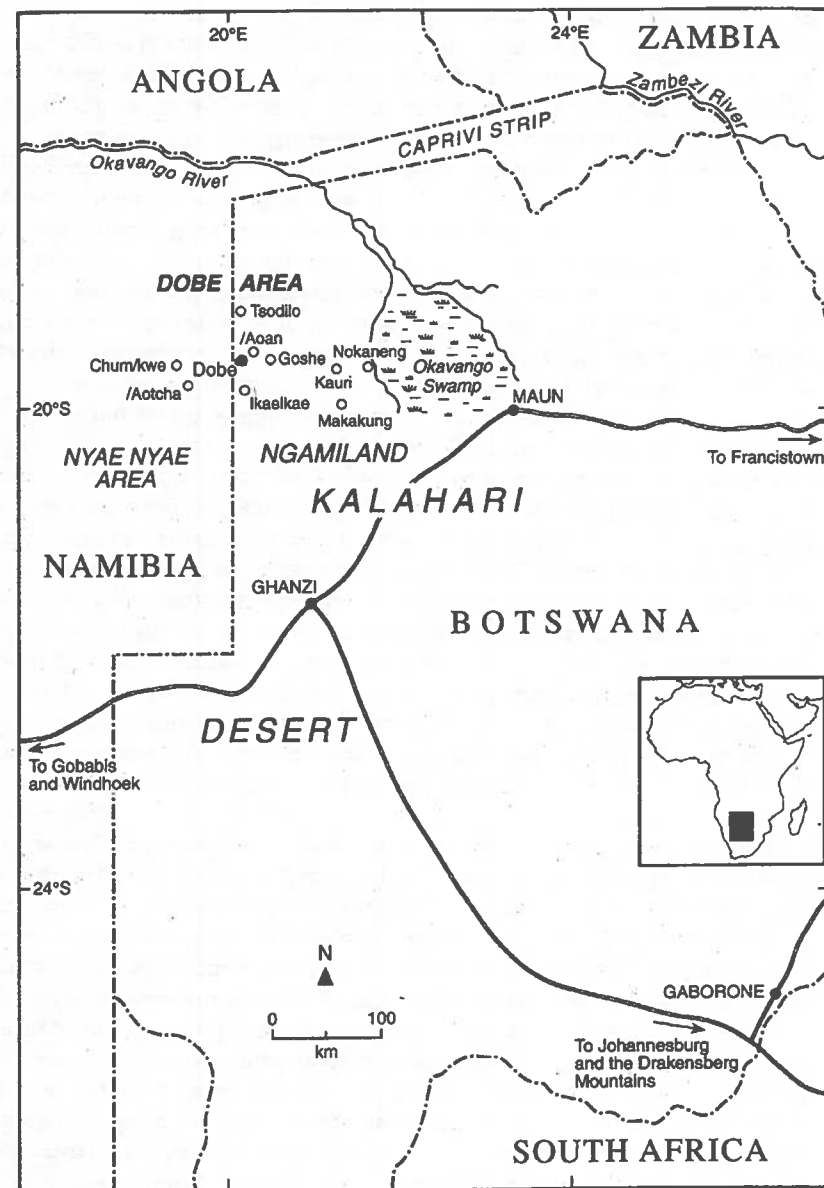


Fig. 8.1. General location of the area referred to in the text and principal names.

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places
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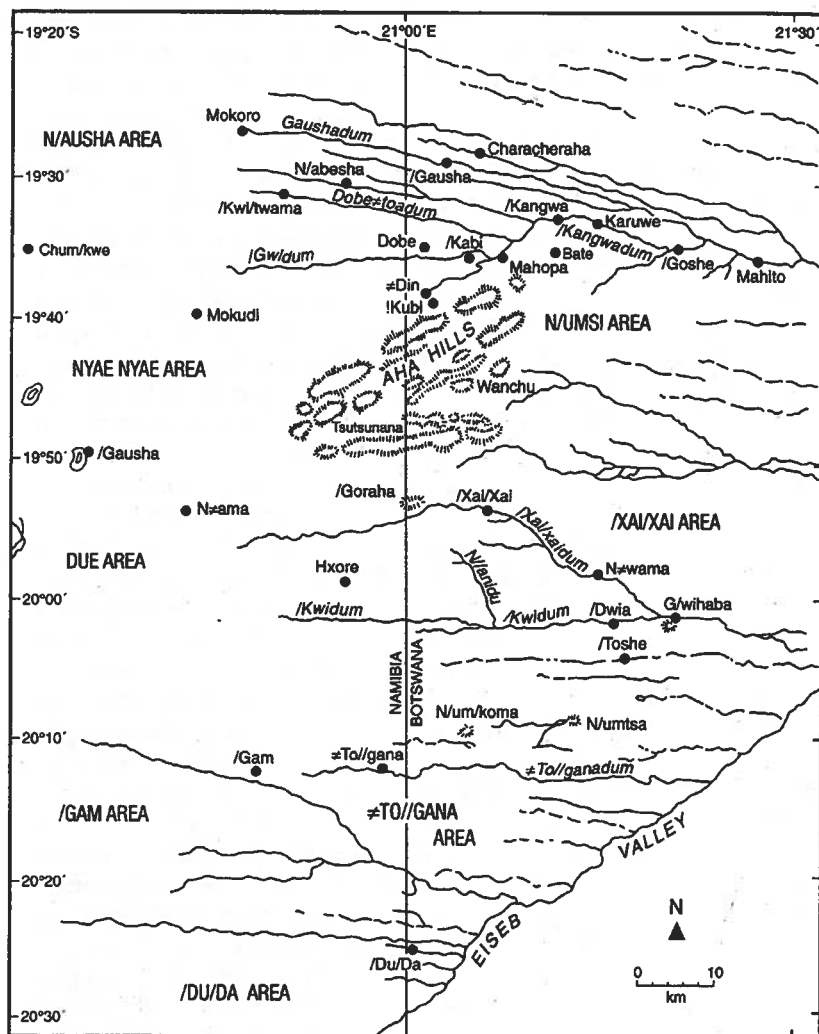


Fig. 8.2. /Xai/Xai region showing areas utilized by different groups.

A major source of support for /Xai/Xai residents came in the form of employment by government, which included road clearing for the North West District Council and the Roads Department. Six people worked for the Geological Survey, while two worked for the Natural Resource Management Advisor (NRMA) from SNV, the Netherlands Development Organization. Two other people worked as borehole pumpers, while one worked for the

Tribal Administration (the headman), two worked for the health department of the Council, and one served as a warden for the Tawana Land Board. A total of eighty people were employed, the majority of them being paid to do road clearing.

Botswana's effective drought relief programme was expanded upon in the CBPP relief efforts. Not only were local people able to get work through labour-based relief and development projects, but they also received rations similar to those provided to destitutes by the District Council, including maize, sorghum, beans, and oil. The amounts provided to people depended on household size. As one development worker put it, there was so much food in some of the households that they had to sleep outside. Another person at /Xai/Xai said that she was happy for the food and the jobs, but that she would prefer to have her cattle. Yet another woman suggested that the CBPP relief food would eventually run out and that people would be 'back where we started from'. The majority of the people were definitely pleased that the government had provided them with assistance, and they looked forward to receiving their new cattle once the restocking exercise was implemented at /Xai/Xai.

Overall, the lessons from the 1977-8 FMD relief operation were not lost on the Botswana Government and the North West District Council. Efforts were made to provide significant amounts of cash and relief food relatively quickly in order to offset the negative effects of the CBPP cattle eradication. A variety of government institutions and non-government organizations took part in the relief and development efforts in Ngamiland. Members of the /Xai/Xai community were given the opportunity to assess the impacts of the newly constructed Setata Fence, a veterinary cordon fence constructed in the western Ngamiland region from the Namibian border to the Buffalo Fence to control the spread of CBPP. It is interesting to note that, as in 1977-8, the opinions of local people had no impact on the government's decisions on the construction, location, and type of cordon fence in spite of its negative impact on wildlife in the western Ngamiland region.

The decision of the government to erect new cordon fences in the area was greeted with dismay by some of the people in western Ngamiland. While there was some variation in the views that people had, there was a general sense that the establishment of the fences was the first step towards the enclosure of the open rangelands of the north-western Kalahari. Some people noted that the fences were contributing to the losses of wildlife, while others said that the fences were going to limit the movements of their domestic animals with potentially harmful effects in drought periods.

In the mid-1990s, the Botswana Defence Force considered establishing a military base in the western Ngamiland area. Although the base has yet to become a reality, the numbers of military personnel in the area has been fairly high. One impact of the increased presence of the military was larger numbers of arrests of local people for engaging in subsistence hunting. In

one case, in June 1995, the Anti-Poaching Unit arrested seven men for hunting illegally and confiscated all their equipment and the horses and donkeys they were using (Hitchcock and Masilo 1995; Hitchcock *et al.* 1996). The Botswana Defence Force also raised questions about tourists being brought to /Xai/Xai by professional tourism groups in 1996. The response to these concerns on the part of some local people was that the military was attempting to impose restrictions on their livelihoods.

The loss of livestock had significant socio-economic impacts on local people in western Ngamiland and the northern Kalahari in general. Some people fell back on foraging, going into the bush to collect wild foods. Others crossed the border into Namibia to live with relatives and friends. Still others moved to the towns around the Okavango Delta such as Gomare, Nakaneng, and Maun where they sought employment or lived with relatives. Access to milk was reduced, which affected the nutritional well-being of the local populations in western Ngamiland. The lack of livestock also had social impacts, with local people not able to pay bride-price (*bogadi*) in the form of cattle. There were also difficulties because people had to rely on donkeys for pulling ploughs, something that affected agricultural production.

In order to counteract the negative impacts of the cattle eradication, the Botswana government established a cash compensation programme for those people whose livestock were killed. The government paid some 500 *pula* per animal for 70 per cent of the animals belonging to a cattle owner, with the other 30 per cent of the compensation given in kind. People were also given food, including maize, sorghum, beans, and oil. This food was distributed fairly widely, with some of it being circulated to relatives across the border in Namibia or sold to people who were better off, including government officials working in the region.

Botswana has mounted a number of successful drought relief feeding activities over the past several decades (Hinchey 1979; Holm and Morgan 1985; Hay 1988). Three out of five people in Botswana were receiving food aid at the peak of the feeding programme in the mid-1980s. In the latter part of the 1990s, food was provided to the entire population of Ngamiland, with the exception of some of those people living in urban areas.

In order to cope with the CBPP crisis, the Botswana government initiated a multipronged effort that included commodity aid, cash-for-work programmes, compensation for lost livestock both in kind and in cash, and suspension of loans at the National Development Bank. The government expanded its supplementary feeding programmes for school children from 191 days a year to 365 days. Assistance was also provided for medically selected (i.e. specially targeted) malnourished children. The agencies responsible for these activities included the Food Resources Department (FRD) of the Ministry of Local Government, Lands, and Housing and the North West District Council. The programme was almost entirely dependent on food aid from donors in the past, but under the CBPP programme, the government

used Domestic Development Funds (DDF). Overall, according to government analysts, the programme was implemented and executed smoothly, though there were some initial logistical difficulties. There was also some leakage (i.e. some of those who were supposed to get specified amounts of food did not get it, or got only a portion of what they were supposed to receive).

One group that received special assistance was that defined as Remote Area Dwellers (RADs). Remote Area Dwellers were provided with a full ration that was intended to cover all their food requirements. No attempts were made to differentiate among the people in need within the RAD target group. All of the people in this category were regarded as being seriously affected by the livestock disease control efforts, and they were seen as having few alternative sources of income. It should be noted that in spite of the availability of food, possible micro-nutrient deficiencies may have resulted from the composition of the ration. This is the case, for example, with a lack of sufficient Vitamins A and C. The usual sources of these micro-nutrients are products such as wild plant foods. These goods were much in demand as a result of increased numbers of people engaged in foraging.

The rural economy in Botswana is both varied and complex (Central Statistics Office 1976; Chernichovsky, Lucas, and Mueller 1985). Rural people tend to spread their risk; in other words, they diversify their subsistence and income sources (Hitchcock 1978). According to the RIDS survey of 1975-6, the relative importance of income in kind is greater among poorer households than among those that are better off. There is thus an inverse relationship between income in kind and income level. Among lower-level income groups, there is a much greater degree of dependence on transfers, both private, such as mine labour remittances and public, such as the government relief provision. Among the poor, including RADs, there is a relatively high level of dependency on government welfare and assistance programmes. This must be viewed in a balanced way, however. Currently there are few economic opportunities available to people in rural areas other than tourism and craft production.

In spite of the difficulties facing people due to the loss of livestock, there were some positive spin-off effects. One of these was that the grazing and browsing resources had a chance to recover, as did the wildlife populations. The complications of the cattle eradication campaign also had the effect of bringing people together who in the past were at loggerheads over issues such as land use. The Herero in /Xai/Xai, for example, who kept fairly sizeable herds of livestock, wanted access to the G/wihaba and Aha Hills areas, which traditionally belonged to Ju/'hoansi *n'ore kxausi*, the 'owners' of the land around the two sets of hills. The Ju/'hoansi San and the Herero at /Xai/Xai began to talk about forming a quota management committee (QMC), which, once established, could be granted the wildlife quota for the CHAs NG 4 and NG 5 in western Ngamiland under new Botswana Government legislation

relating to community-based natural resource management (Republic of Botswana 1986, 1998).

In October, 1997, the people of /Xai/Xai formed the /Xai/Xai Tlhabololo Trust, and as a result they were able to obtain the wildlife quota from the Department of Wildlife and National Parks. Some of this quota they set aside for community use, allowing local hunters to take a portion of the animals available. The rest they pledged to commercial use, and they leased out the rights over that quota to a private safari operator. According to Motshubi (1999: 46) the people of /Xai/Xai were able to generate P40,000 from hunting, P20,000 from photo-tourism, and P20,000 from craft production in the first year of operation. Some of these funds were derived from individuals who camped in NG 4 (see Fig. 8.3), who were required to pay a camping fee of P10 per night to the trust.

A major concern of local people at /Xai/Xai related to central government plans for the expansion of the national monument around the caves at G/wihaba (Drotsky's Caves). The G/wihaba Caves had been declared a National Monument under the Monuments, Relics, and Antiquities Act (No. 15, 1970; see *The Laws of Botswana*, Ch. 59.03). In 1995, the National Museum, Monuments, and Art Gallery told the people of /Xai/Xai that they wanted to establish a conservation zone around the G/wihaba and Koanaka Hills because they contained resources of scientific importance. Discussions with people from /Xai/Xai revealed that there were a variety of sentiments about such plans. Some people wanted to see a conservation area established because they thought that it would increase the number of tourists coming to the area. Others were opposed to the idea because they felt it would infringe on their hunting and gathering rights. Still others wanted to have a conservation zone around the hills on the conditions that they were allowed to continue to use the resources there, and that they received a portion of the gate receipts (Hitchcock *et al.* 1996). Several people said that they would be willing to support the establishment of a conservation zone by the National Museum only on the condition that the Botswana government passed a new piece of monuments legislation that allowed for local people to be granted a portion of the benefits that were produced. It was clear, therefore, that the establishment of new legislation on conservation is viewed as an important aspect of future efforts to ensure the well-being of local people and habitats in the Ngamiland region.

There were efforts in the late 1990s to map the traditional territories (*n/loresi*) areas surrounding communities in western Ngamiland so that people could establish claims to them. Such efforts became especially important in the light of an announcement in mid-1999 that there was a likelihood of the government of Botswana establishing commercial cattle ranches along the Botswana–Namibia border. Thus, the efforts to take advantage of Botswana government plans to promote the formation of community trusts under its community-based natural resource management programme assumed even

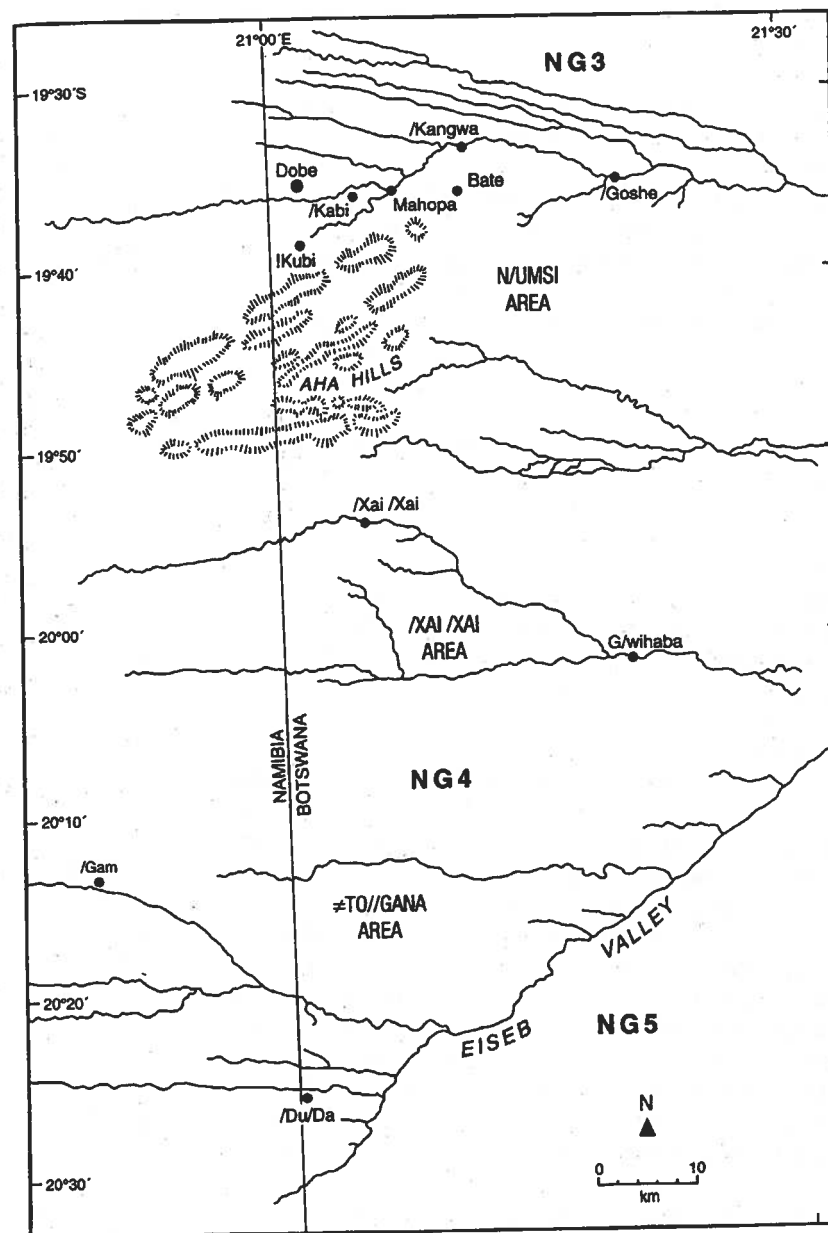


Fig. 8.3. Controlled hunting areas in the /Xai/Xai region.

greater importance. There are plans to seek land allocations from the Tawana Land Board and to establish a Dobe trust along the lines of the /Xai/Xai Tlhabololo Trust. The people of Dobe were having to cope with pressures from /Kangwa, a larger, multi-ethnic community several kilometres to the east. While not officially constituted as a subdistrict centre, /Kangwa sought to exert control over Dobe. The Member of Parliament from Tsau, the Hon. Mr Nkate, told the people of Dobe that the /Kangwa Village Development Committee should receive rental payments from the Dobe Village Development Committee. For their part, residents of /Kangwa said that they considered Dobe to be their cattlepost.

One of the concerns of the people of Dobe is that they do not have the same degree of control over their area as do the people of /Xai/Xai. They cannot charge fees for camping in NG 3, the 5,760 km² CCHA in which Dobe is located. There are also concerns in Dobe about the fact that the NG 4 area in which /Xai/Xai is located extends north into the land claimed by *n!ore kxausi* in the Dobe area. As one Dobe Ju/'hoan put it, 'We want to own the land around Dobe, not just have access to it.' According to the people of Dobe to whom I spoke in August, 1999, //Gau is the owner of Dobe. The big problem facing //Gau, however, is how he and the people with whom he lives can substantiate their claims to the Dobe area and ensure that these claims are recognized by the Tawana Land Board in Maun.

The people of Dobe are looking at other cases in which local people have been able to establish their own community trusts and gain control over the wildlife quota in the areas in which they live. There are several community trusts in which San have a significant say: (1) the /Xai/Xai Tlhabololo Trust, (2) the Ukhwi community trust (Nqwaa Khobee Yeya Trust) in Kgalagadi District, (3) the Huiku Trust in the Groot Laagte Wildlife Management Area of Ghanzi District (established in May 1999) (see Ch. 7), and (4) the Nyae Nyae Conservancy, just across the border from Dobe in Namibia. Some of these community-based organizations have been able to generate a fairly sizeable amount of income for their members, a portion of which is reinvested in community conservation and development (Bieseke and Hitchcock 2000; Motshubi 1999).

At present, the applications for new wells in western Ngamiland have been frozen by the North-West District Council and the Tawana Land Board, pending the results of consultancies on water resources and cordon fencing being conducted in the region. Meanwhile, the people of the communities of Dobe and /Goshe to the east of /Kangwa are seeking help from Ditshwanelo, the Botswana Centre for Human Rights, Kuru Development Trust, and the Kalahari Peoples Fund in their efforts to secure rights over their land. At this stage, it is unclear as to what will transpire with the land claim efforts in western Ngamiland, but there is no question that people are working together in an effort to obtain clear title over their lands and resources, raise their incomes, enhance their well-being, and improve the quality of their lives.

Strategies for Coping with Uncertainty

People in the northern Kalahari, like those in other parts of southern Africa, are flexible, resilient, and innovative in their approaches to solving environmental problems and overcoming constraints. When a drought or some other kind of stress situation commences, human adaptive responses are set in motion. An almost universal response of Kalahari peoples is to diversify their strategies, exploiting a variety of different kinds of resources and taking advantage of economic opportunities. Another common response is to move, either away from places afflicted by drought or disaster, or to places where resources are available, such as towns. The formation of social alliances and the use of buffering strategies such as food storage have also proved to be very useful in dealing with disasters and uncertainty.

Natural resource management among Kalahari populations is based on extensive and environmental knowledge and experience. They monitor the environment carefully, looking for patterns and trends. Data are obtained on the state of the ecosystem, and information on the distribution, abundance, and types of resources are shared actively among community members. The generalized subsistence system of groups (e.g. those who are foragers or agro-pastoralists) meant that they do not place too much pressure on a few plants and animals. As the amounts of specific desirable resources declined, people will shift to alternative resources. Not only do people map themselves onto resources through movement, but resources are mapped onto people through sharing and exchange systems. People are also mapped onto people through kinship and social alliances, including marriage and trade partnerships, and exchange relations.

The landscape on which local people reside and earn their livelihoods is not simply undifferentiated space; rather, the land is divided into tracts that comprise the basic subsistence and residential areas of local groups. They have long-standing rights to these areas, and in many cases they have ideological connections to them as well. Resource areas, which some social scientists have called 'territories', contain a number of different kinds of resources, including water-points, wild food plants and medicines, wild animals, trees and shrubs for shelter, fuel, and building materials, and materials such as termite earth and ochre used for construction and for adornment (Hitchcock 1978; Silberbauer 1981). Territories are named areas that have boundaries that people generally are familiar with. In order to enter another group's territory, permission must be sought from the traditional land-holders, usually those individuals who have resided there the longest. The rights to these territories are usually inherited from one's parents, although there were cases in which people obtained customary rights to land through moving into an unclaimed area and establishing occupancy rights or seeking rights from traditional authorities.

One of the strategies for coping with drought and socio-economic

uncertainty employed by local people was to request permission to move to another group's territory which had sufficient resources to sustain a larger number of people. Usually people asked permission to visit the territories of people with whom they already had social ties, such as those created through marriage (affinal ties) or ones that came about through trade partnerships. In most instances, if the territory 'owners' felt that there were enough resources available in their area, they gave permission for the other people to enter. There were cases, however, when permission was refused, especially in times of extreme drought. This was said to have been the case in the central Kalahari region of Botswana in 1933, for example, when a lengthy drought saw large areas affected, so much so, according to informants, that even the large trees along dried-out rivers were destroyed.

In times of drought and disaster the people of the northern Kalahari sometimes sought to prevent the overexploitation of specific species through the use of taboos. These taboos included restrictions about the kinds of species that one could collect or consume. There were limits placed on the use of certain species; some nut- and fruit-bearing tree species such as *marula* (*Sclerocarya caffra*), for example, were not supposed to be cut for firewood. Jural rules about resource use also varied according to age, gender, and, in some cases, individual personal characteristics. Some animal parts were reserved for elderly people. Certain species of medicinal plants were supposed to be used only by people defined as traditional healers. There are also specific items that were to be used exclusively by people who had the ability to go into trance and conduct healing ceremonies.

Another way that northern Kalahari populations buffered themselves against possible resource scarcity in drought periods was to store food. When game was killed, some of the meat was dried by cutting it into strips and hanging it in trees, turning the meat into what in southern Africa is known as biltong. There were also cases in which sizeable amounts of wild plant resources were obtained and kept in people's houses or hung in bags in trees. In some cases, melon rinds were cut into strips and dried for later consumption.

In order to cope with extreme drought conditions, people would scavenge the meat of animal carcasses. One problem with this strategy was that the condition of the carcass was often such that the nutrient value was low. Another was that in some cases diseases such as botulism were caught from the carcasses of dead animals. Sometimes people collected bones and sold them to farmers who used them to feed their cattle or sold them to bonemeal factories to raise income. It should be noted here that the sale and use of bonemeal has been restricted in the United Kingdom as part of the government's efforts to control the spread of mad cow disease. The list of Specified Bovine Offals (SBOs) that were banned for use in the livestock and food industries was expanded as a result of the BSE crisis.

Local people employed creative social strategies to deal with potential

resource problems. One such strategy was to establish a fictive kinship bond through exchange systems (Wiessner 1977). The social ties that were created by these exchanges were important because they facilitated the sharing of information about the state of the environment in various areas. They also helped establish a widespread network of fictive kin who had mutual rights and obligations. These people could then be contacted if a group or individual was under duress in the hopes that they might be able to accommodate them by providing food, water, and a place to stay.

There were cases in extreme drought periods when people experimented with new kinds of plants, essentially diversifying their diets. It was at these points that people resorted to eating *Acacia* gum, tree bark, and roots with which they were not familiar. This could be a risky strategy since some of these plants had high levels of secondary compounds that were toxic, and the number of plant poisoning cases often rose during drought periods. In order to get around this problem, various methods were employed to process these plants, including soaking them for long periods in water.

A common strategy of Botswana is to move their herds or flocks to places where water and grazing are available. In some parts of the northern Kalahari, people would send their animals to other areas in the company of herdboys (Schapera 1943). Families would sometimes split up into production units, with women and young children staying at the homestead while the men went to the mines, towns, or remote grazing localities.

A social response of people to drought in the northern Kalahari and Africa generally is the migration of people to other places in order to seek employment or to find relatives and friends upon whom they can depend for support. This strategy can work for a while, but the longer the drought lasts the more difficult it becomes for the hosts. A problem with the migration option is that the numbers of jobs and resources tend to decline in drought periods, thus increasing the competition among individuals and groups.

An ingenious coping strategy of people in southern Africa is to engage in the long-term loan of domestic animals to other people, either kin or non-kin, who then manage those animals for them in exchange for the use of livestock products such as milk and dung. This livestock loan system, which is known as *mafisa* in Botswana and *sisu* in Swaziland, is sometimes structured in such away that the people to whom the animals are loaned are given a young animal (e.g. a calf) at the end of the year in exchange for their labour. This social custom enabled livestock-owners to distribute their animals among a number of different people in different places, thus reducing their risk.

Northern Kalahari farmers, especially women, engaged in a number of different kinds of resource management strategies, drawing on their extensive indigenous knowledge, in order to cope with uncertainty. They maintained seeds of a variety of different kinds of crops, selecting these carefully for specific characteristics such as drought- and pest-resistance, types of soils in

which they grow, and taste. They staggered their planting so as to ensure that the crops got moisture during the highly variable rainy season. They also planted their crops in a number of different places, fragmenting their fields intentionally so as to maximize the chances that they would get at least some moisture so that they could obtain a minimum crop yield.

Farmers experimented with innovative farming and soil and water conservation techniques. They erected water-harvesting systems, built retaining walls, and ploughed fields in the winter so as to increase the chances that moisture would percolate into the soil when the rains came in the summer. Farmers used a number of innovative methods for restoring soil fertility, including adding green mulch to the soil and composting. They attempted to monitor their fields more closely in growing periods, in part to prevent animals such as small antelopes and baboons (*Papio ursinus*) from getting into them. They sometimes place small traps (e.g. deadfalls, snares) at strategic points in the fences around the fields in the hope that they could catch the animals that were raiding their crops at night.

Farmers attempted to control the degree to which crucial resources, such as stubble in the fields, were exploited. They limited the number of cattle that could come into the fields, or they restricted the timing of their use of the stubble, which they realized was a highly nutritious feed source. A coping strategy of many people in southern Africa is labour intensification, where people expand their work effort. One way that they did this was to spend more time in the fields. They also brought in additional labourers such as children to assist in agricultural, domestic, and off-farm activities. It was not unusual in drought periods to see very young children watching over the fields or herding animals and collecting water, firewood, and crop residues to feed livestock.

In order to buffer themselves against nutritional deficiencies in drought and other stress periods, northern Kalahari populations collected wild plants, some of which they kept for home consumption and others of which they sold. Some people also collected wild insects and occasionally caught small wild animals, some of which they consumed and parts of which they sold (e.g. to traditional healers who would use the animal parts in medicine).

It is interesting to note that there may be a differential response of females as opposed to males to drought problems. In many parts of Africa it is women who are involved extensively in agricultural work, whereas men tend to do more of the herding of livestock. As a result, when a drought occurs, women tend to lose agricultural employment opportunities more readily than men. Women also tend to have fewer options in terms of going to town to seek employment because of their domestic responsibilities. In order to cope with this situation, women engage in such activities as making and selling crafts and doing domestic work for other people.

Southern African populations have coped with drought problems by depending on their governments or aid agencies for support while pursuing

their traditional socio-economic activities as much as they can given prevailing environmental and social conditions. Drought relief programmes that were implemented in southern Africa saved the lives of many people. At the same time, they contributed to what some analysts have described as a 'dependency syndrome', in which people gave up their regular activities and became reliant on handouts. In order to avoid this problem, governments and international relief agencies established labour-based rural development projects in which local people are given cash for work such as removing brush and stumps from agricultural fields or clearing trees and shrubs in order to make roads.

The drought relief programmes mounted by the Botswana government and international agencies have been judged as relatively successful in averting the disastrous consequences that affected other African countries (Holm and Morgan 1985). Efforts were made not only to provide food for people but also to assist them through replacement of lost income (Hay 1988). A special direct feeding programme was established in which health centres were given money, and then food was purchased locally from farmers or from co-operatives comprised of fishermen or herders. This strategy not only encouraged production but also injected more income into the rural areas (ibid.). Drought relief funds were used to build teachers' quarters and other facilities through Village Development Committees (VDCs); thus, the village had a longer-term stake in maintaining public works.

In 1984-5 a major remote area drought relief programme was established in Botswana in order to provide food and work for populations under stress in remote parts of the country. It should be noted that the western districts of Botswana, those with higher than average numbers of remote area dwellers, are the ones with higher levels of people who are nutritionally at risk. The selection criteria for those special remote area programmes involved determining those people who were beyond the reach of health facilities. By mid-1985 there were 20,000-21,000 remote area dwellers being fed. The food basket consisted of three basic commodities: (1) maize meal (12.5 kg per person per month), (2) beans (3.5 kg per person per month), and (3) vegetable oil (1 kg per person per month). This commodity basket was higher than that provided to nutritionally affected populations such as the vulnerable groups (under-5s, pregnant and lactating mothers) who were fed through the Institutional Feeding Programme (IFP) at schools and health posts in Botswana.

One of the more popular drought relief efforts in Botswana involved the destumping of agricultural fields. There was also a labour-based relief programme that served 170,000 people in rural Botswana, in which people were paid 2 *pula* (then about US\$1/UK 30p) per day to do such tasks as clearing roads and constructing storehouses and other facilities. Assistance was also provided in ploughing of fields. Tractors were made available by the Ministry of Agriculture to help people plough since in many cases their cattle were not

in good enough condition to work, and their labour was divided because people were in towns seeking employment or at cattleposts taking care of cattle.

A major concern of the people of the northern Kalahari, besides the livestock disease situation, is that relating to human disease. Southern Africa was said to be the global epicentre of HIV/AIDS at the end of the millennium. Although the HIV/AIDS rate among the people of western Ngamiland appears to be much lower at present than is the case among other populations in Botswana, the infection rate is on the increase. Tuberculosis is also on the increase, linked in part to the spread of HIV/AIDS and other sexually transmitted diseases.

As has been documented so beautifully in the work of Katz, Bieseke, and St Denis (1997), the Ju/'hoansi San of north-western Botswana engage frequently in healing rituals that are done through dance and going into trance. These healing practices are important means of curing the sick, alleviating stress, and bringing about positive changes in their communities.

Recently, the Ju/'hoansi and Herero of north-western Botswana have recommended that a 'community wellness programme' should be instituted that includes components to address problems of human and livestock health, nutrition, social conflict, and poverty. Having a culturally sensitive intervention programme that treats not only symptoms but also root causes of problems will go a long way towards ensuring that the people of the northern Kalahari will be able to live sustainably and in peace in the new millennium.

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9

Drought as a Revelatory Crisis Revisited: An Exploration of Shifting Entitlements and Hierarchies

Jacqueline S. Solway

Introduction

In his analysis of the domestic mode of production Sahlins (1972: 124, 143) refers to a revelatory crisis as one of the few occasions outside of an 'act of ethnographic will' that exposes to the observer the central contradiction in that mode of production. The drought in southern Africa that occurred in Botswana in varying waves of intensity between 1979 and 1987 constituted such a revelatory crisis.¹ It precipitated the interruption of socio-economic patterns to a degree sufficient to lay bare contradictions in the existing order that had been latent or contained prior to the drought. Structural contradictions such as those between household and kindred, between individualized and communal property claims, between production for market and production for subsistence, between the state's vision of 'rational' peasant production and the realities of daily economic life in the rural areas, and those between classes were revealed to varying degrees and in different ways both to the outside observer and to the participants themselves. Moreover, the drought also exposed the extent to which conditions in the rural areas had deteriorated. In doing so it revealed a 'crisis of social reproduction' (cf. Watts 1987: 207); the crisis at hand was not simply one of external origin but was systemic and indicative of long-term change.

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¹ Sahlins draws upon the work of R. Firth on Tikopia for this analysis. The specific revelatory crisis was a famine.