

# 8

## FARMING

Food, income and security



What does the future hold  
for people with livelihoods  
deeply rooted in farming?

## OKAVANGO RIVER

**PEOPLE USE LAND** and its resources in the Okavango Basin in a variety of ways, but much more land is used for farming than for any other purpose. Many more people also have livelihoods based on agriculture than on any other activity. Farming is not a simple enterprise, however. The host of factors that limit its success can be divided into two groups: those associated with the natural environment (soil quality, rainfall, evaporation and diseases and pests) and those constraints of a socio-economic nature (mainly household labour, availability of land, and access to other income). Alone, or in combination, these factors result in farmers being successful in some places, or in certain years, but not in others. Crops grow well in one area, but not elsewhere, for example. Rain often falls too irregularly to support good growth, and high rates of evaporation mean that water is often lost rapidly. Grasses vary in abundance and nutritional quality, and fires destroy hundreds of square kilometres of pastures on which livestock depend. Livestock diseases limit the vigour of the animals and restrict marketing opportunities. Some people rely heavily on farming for most or all their food needs whereas others are fortunate to have alternative sources of sustenance and income. Similarly, a few people can sell farm products if their farms are close to urban areas and customers with surplus cash. Many other farmers have little chance of marketing surpluses.

Residents of the Okavango Basin have faced these and other factors over many generations, and farmers have tuned their practices in ways to reduce the effects of the constraints. They have also found ways of exploiting occasional new opportunities. And since the constraints and opportunities vary across the Basin, we see different strategies and practices in different areas. In broad terms, the value of farming varies from the north to the south, much like the gradient of high to low rainfall (see page 63). Angolans are much more reliant on farming as a major source of food than people in Kavango and Ngamiland. In those two countries, a large number of people farm but the value of incomes from wages, remittances, pensions and other cash sources greatly exceeds that of farming. These are some of the issues explored in *Farming: food, income and security*.

### The farmers

Small-scale farmers dominate farming activity in the Basin: there may be about 60,000 such farmers in Angola, 18,000 along the river in Kavango and 8,500 farming households close to the Delta in Ngamiland.<sup>1</sup>

Each household normally cultivates a few hectares and sometimes keeps small herds of cattle and goats. Probably 95% or more of all farming is practiced on roughly this basis. Most of the farmers live in rural areas concentrated in villages in Angola and Ngamiland or strung out along the river in Kavango. South and away from the Okavango and Delta in Kavango and Ngamiland are several hundred commercial farmers who have large herds of cattle. Some of them also have big fields of millet, but their farming activities have little or no association with the river. There are also several larger irrigation projects at Musese, Vungu Vungu, Shadikongoro, Shitemo, Bagani and Samochima, which mainly produce maize, cotton and wheat. Between them, these farms irrigate only about 1,200 hectares, but much bigger irrigation projects are planned in Kavango (see page 163).<sup>2</sup>

True subsistence farming is only practiced by the poorest households, who live mainly on the food they harvest with some additional fare coming from fish, honey and wild fruits. At the other end of the socio-economic scale are the many wealthier homes that live largely on bought food. Much of their income comes from wages or business profits. They, too, live in rural areas where the homes and farms look much the same as those of neighbouring subsistence farmers. Farm harvests provide supplementary food for the families of these richer farmers, but they also invest surplus cash in their farms to enhance their security. Most of their investments are in the form of livestock.

The focus on these two categories of farmers helps to introduce the wide spectrum of farming interests in the Basin. There is, of course, a complete gradient of wealth groups in between. The great majority of poor, subsistence farmers are in Angola, while proportions of farmers across the different wealth categories are more evenly spread in Kavango and Ngamiland. For example, only about 10% of farmers live mainly from their own farming produce in Ngamiland.<sup>3</sup>

Several household conditions and farming activities vary in clear relation to household wealth. Richer farmers tend to have larger households, their homes have a number of sources of cash income (e.g. wages, pensions, remittances, business activities), and they have several big fields and large numbers of livestock (**Figure 41**). Men usually head such households. At the other end of the scale, women are often the heads of subsistence households where families, cultivated areas, and livestock holdings are small.

Wealthier farmers also tend to be more successful in producing better yields. They may buy improved seed



Most fields along the Cubango/Okavango are farmed manually on soils partially formed by repeated flooding long ago.

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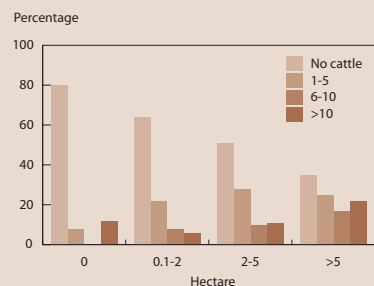
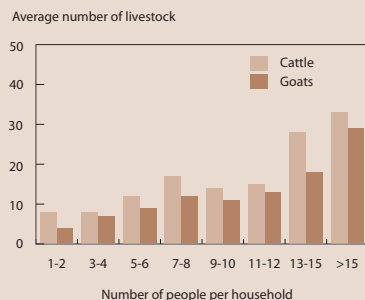
cultivars and farm implements, hire tractors, and fence their fields to prevent losses from stray animals. Richer farmers are also better able to supply a key input for farming: labour. Such manpower – more usually womanpower – is provided by their larger families and by hiring local hands when needed. ‘When needed’ is important because there are several critical periods when lots of work is required: to clear and plough fields before the first good rains fall so that planting can begin immediately, to thin young seedlings, weed the fields, and to harvest crops before they spoil or are lost to pests. All these jobs have to be done quickly, and at just the right time. Total amounts of time spent on crop production are impressive: about

Several ingredients are required to produce crops: cleared land, soil nutrients, water and labour. The last of these is often the most critical, especially in having enough labour available at appropriate times to weed and harvest.



**Figure 41**

Larger households have bigger herds of cattle and goats than smaller homes in Kavango (top) and people with bigger fields also have larger herds of cattle in Ngamiland (bottom).<sup>4</sup>



270 hours of work per hectare of *molapo* field and 175 hours per hectare of dry-land field in Ngamiland, and 100–160 hours per hectare of dry-land field in Kavango (*molapo* and dry-land fields are described on page 145). Weeding is especially critical, labour intensive and time consuming. Frequencies of weeding vary, depending on the severity of weed infestation, type of crop and availability of labour, but fields are usually weeded two or three times per season in Angola, and once or twice in Ngamiland and Kavango.

## Farm produce

Crop farming is dominated by four staple foods: pearl millet (*mahangu* in Kavango, *masangu* in Angola and *lebelebele* in Ngamiland), maize, sorghum and manioc (also called cassava). Much more land and effort is devoted to these staples than to other vegetable and fruit crops (mainly beans,

melons, pumpkins, cabbages, and tomatoes), groundnuts, sugar cane and bananas. Vegetables and fruit are grown more commonly in Angola than in the drier downstream areas. New crops of maize, millet and sorghum are planted each year, but manioc grows – and can be harvested – over three or four years. Its production is thus more reliable than that of the three cereals, but manioc tubers have poor nutritional value because they provide little protein. Sorghum is used both as a staple cereal food and to produce beer.

The mix and dominance of staple crops varies across the Basin in a rather clear way, and again this follows the gradient of rainfall across the region (Figure 42). Maize, supplemented by manioc, is the main crop in the north-western Cubango sub-Basin. A greater variety of crops is grown in this wetter area, where farmers also benefit from more fertile soils than in most other areas. Manioc predominates in the Cuito sub-

The four main cereal crops in the Basin: millet (top left), manioc (top right), sorghum (bottom left) and maize (bottom right).



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Millet (above) is the only cereal that grows well on nutrient-poor sandy soils in areas where rainfall is low and unpredictable. Ears of millet are threshed (opposite top) before the grain is ground and ready for cooking. Sugar cane (opposite bottom) is grown commonly on onaka fields in higher rainfall areas in Angola.

Basin, but maize and vegetables (planted in floodplain fields) are important supplements in this zone. Both maize and sorghum require rather high levels of soil moisture and thus grow only in areas of higher rainfall, or on patches subject to partial flooding or in clayey soils that retain more water than sand. Moving south-east, maize gradually declines in importance and is increasingly replaced by millet. This is the characterizing feature of the third zone, extending from about Caiundu all the way to the Delta. Millet is the only cereal that can grow productively in poor quality sandy soils where rainfall is relatively low. About 95% of cultivated land in Kavango is planted with millet, while only small patches of more clayey soil are used for maize and sorghum. Farmers around the Delta plant roughly equal proportions of millet, maize and sorghum, but the maize and sorghum is mainly planted in low-lying, clayey soils moistened by rain or rising floodwaters. Many of these soils are very fertile (see page 44).

### Getting the time right

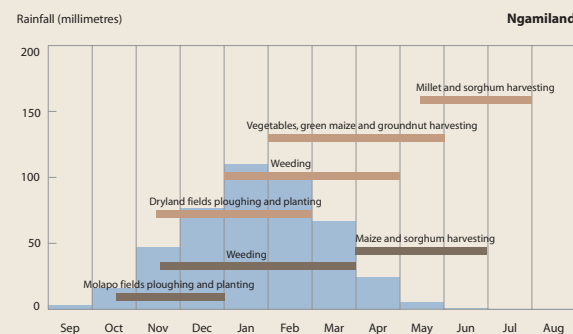
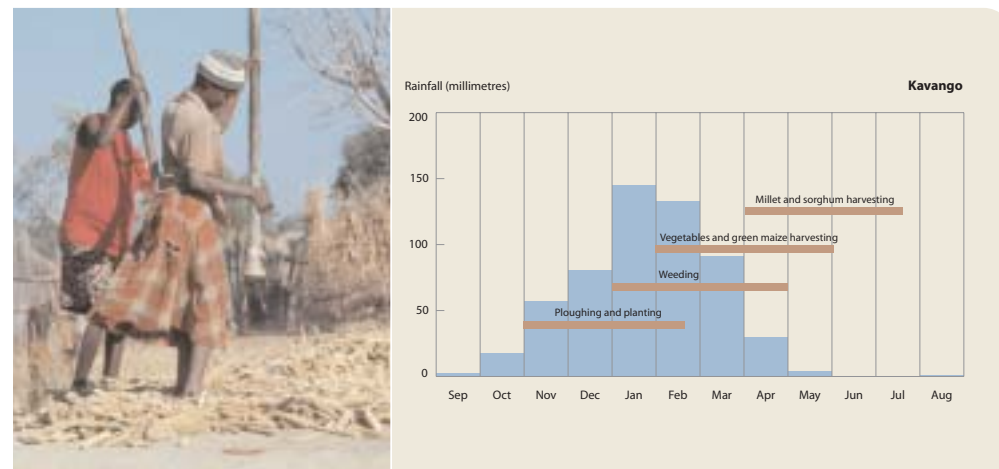
Crop farming is largely a summer activity since this is when most rain falls (Figure 43). There are two reasons why timing is important. First, the shorter the season the more important it is for planting to follow the first good rains immediately. This is particularly critical in

the southern areas where the rain season is much shorter than in Angola. Thus, farmers in Kavango and Ngamiland need to prepare their fields early so that their crops can be planted in December before the best and most frequent rains that normally fall in January and February. Delays in planting result in a greater chance of crops being short of water later on once the rains tail off. In Angola, by contrast, good rains can fall at any time between November and April, and planting can follow any of several adequate falls during early summer. Angolan farmers can also plant more than once, a possibility seldom available to people in Kavango and Ngamiland. Overall, the shorter season in the south gives less flexibility, making it more important to get the timing of planting, weeding and harvesting right.

A second reason for crop production to be timed carefully is to avoid sporadic dry periods. Again, such shortages of rain are more frequent and last longer in the southern areas, where crops also suffer from higher evaporation rates than those in Angola. An example of a long dry and hot spell is given in Figure 44.

Careful timing of crop growth is more critical for dry-land fields than those in floodplains and sodden valleys, where the ground remains wet for much longer. *Molapo* fields in Ngamiland are planted as the floodwaters begin dropping, normally in September

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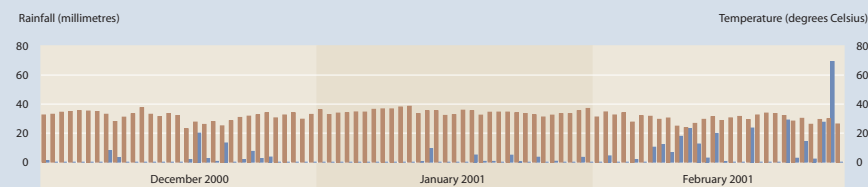
**Figure 43**

Summaries of crop farming activities in Kavango and around the Delta in Ngamiland. The horizontal bars show when most activities take place, while average monthly rainfall figures at Rundu and Maun provide perspectives on how farming events relate to seasonal rainfall. Equivalent information is not available for Angola where many more kinds of crops are grown, the timing of activities is more flexible because of the long rain season and use of wet soils, and some crops are harvested several times. Farming activities in the most northerly, high rainfall areas also differ substantially from those further south in Angola.

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Sorghum (left) is brewed into beer or consumed as a cereal food. The nutrient value of manioc (centre) is low, but it grows more reliably than millet, sorghum and maize and is thus a useful staple food. Ground manioc must be dried before it can be stored for later use (below).



**Figure 44**

Spells of hot, dry weather have devastating impacts on crops. The graph shows rainfall (blue bars) and maximum temperatures (brown bars) each day during December 2000 and January and February 2001 at Rundú. A total of 53 millimetres of rain fell over a few days in the third week of December 2000 when many fields of millet were planted. Much of the next six weeks were then dry, with a total of only 33 millimetres falling during a few scattered showers. It was also very hot, and maximum temperatures rose above 30°C on 39 of the 42 days. Relief eventually came in a spell of cool and wet weather in the last three weeks of February, but most crops planted earlier in December had died by then.

and October. Their clay soils hold moisture from the floods for several weeks and – with luck – are then dampened again by rain in November and December.

Crop seasons during the 1960s and in the 1980s and 1990s were often drier than in other decades (see page 64), and many farmers in Ngamiland switched from maize and sorghum to grow more millet during those dry years.<sup>5</sup> The Botswana government also responded by proclaiming droughts, enabling farmers to benefit from subsidies on the cost of seeds and ploughing. A total of 27 of the 33 years between 1964 and 1997 were declared to be drought years,<sup>6</sup> an amazing total for an area where dry periods are a regular and normal occurrence.

### Farm lands

The vast majority of farming is on dry-land fields where crops are not irrigated and where their growth depends entirely on rain for moisture. Other crops grown using river water include those on the irrigation schemes described above, a few small vegetable gardens belonging to small-scale farmers who irrigate by hand, and numerous *onaka* (in Angola) and *molapo* fields (in Ngamiland). Both are placed close to rivers or streams where the soils are moistened by flooding or the drainage of water into low-lying ground. It is curious that *onaka*- or *molapo*-type fields are not used in Kavango. Maize in Angola is often grown on large *onaka* fields on floodplains, and floodwaters also inundate low-lying soils on *molapo* fields in Ngamiland. *Molapo* fields are either crescent-shaped around islands or elongate rectangles on the margins of river channels in the Delta. About 25% of crop areas around the

Delta are *molapo* fields and the rest are dry-land fields. Maize is the main crop on *molapo* fields, other crops being sorghum, groundnuts, beans, melons and pumpkins. Another kind of *onaka* field is common in small stream valleys in Angola, where the bottomlands of the valleys are sodden. The fields are really very small plots in which vegetables, sugar cane, and bananas are grown. Farmers often dig irrigation canals to divert stream water around the plots.

One of the greatest constraints to farming is the overall poor quality of soils. Although a variety of soils are found in the area, most are poorly suited to crops and much the largest area is covered by Kalahari sands that are low in nutrients, such as nitrogen, potassium and phosphorous. Rainwater also drains through the sands rapidly and so they retain little water. Better soils are generally found in lower lying depressions alongside the rivers and streams or in fossil drainage lines. These soils are more clayey and thus retain reasonable levels of moisture. The most nutrient-rich soils are in the Delta where they were formed by the progressive accumulation of minerals washed down into the floodplains of this wetland. Soils in the north-western Cubango sub-Basin are generally deep and well-drained. However, their nutrient content is relatively low and they can only be farmed for a few years before their fertility is exhausted.

The sizes of fields vary greatly, with wealthier and larger households generally having bigger fields. Field areas also depend much on the availability of good soils on unused land. In Angola, dry-land fields appear to be considerably bigger than the average dry-field areas of between two and five hectares in Kavango and Ngamiland. *Onaka* fields

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cultivated on floodplains in Angola often cover several hectares, but other *onaka* fields in small valleys and *molapo* fields in Ngamiland seldom exceed one hectare per family.

The extent to which fields are fenced varies to a great extent. Most fields are not enclosed and livestock owners thus have to provide herders to ensure that animals do not stray into fresh crops. However, wealthier farmers often fence their fields because they can buy fencing wire or have labour to erect fences of poles, branches or other natural materials. Fences are extremely uncommon in Angola and rather scarce in Kavango, in contrast to Ngamiland where the majority of fields have been fenced, often with the help of government and donor programs.

Farmland in Angola is apparently privately owned and can thus be bought and sold, but it is not clear to what degree legal titles are involved. All land used for agriculture elsewhere in the Basin in Kavango and Ngamiland belongs either to the state or is reserved for traditional, communal or tribal use by rural people.

*There are three major kinds of fields in the Basin: onaka fields in Angola (top), molapo fields in Ngamiland (middle) and widespread dry-land fields (below).*

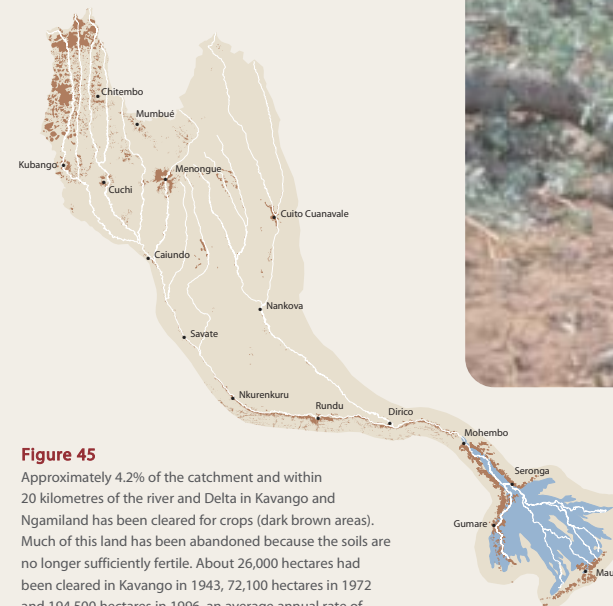
Traditional rights of succession are upheld in both countries. Local headmen play a much stronger role in allocating land for small-scale farming and grazing in Kavango than in Ngamiland where the Land Board regulates such rights for dry land fields (*molapo* fields are still allocated through traditional tenure systems). Thus, most small-scale farms are registered with land



boards in Ngamiland, while similar boards are now being established in Namibia. However, influential people in all three countries are obtaining large farms to an increasing extent. People who negotiate and acquire documents in Luanda to give them rights over farms have expropriated large tracts of farmland in Angola, while wealthier civil servants, businessmen and politicians have obtained large cattle farms to the south of the river and Delta in Kavango and Ngamiland.<sup>7</sup>

The extent of land cleared for crop farming is impressive, especially around the western and southern margins of the Delta and on the Kavango side of the Okavango where little land remains in its natural condition (**Figure 45**). Much less ground has been cleared north of the Okavango on the Angolan side of the river and further north. However, massive expanses of land have been cleared around the bigger towns

*Trees and brush are burnt to help clear new fields. However, the fires often run wild and then burn large areas of surrounding woodlands, pastures and floodplains.*



**Figure 45**

Approximately 4.2% of the catchment and within 20 kilometres of the river and Delta in Kavango and Ngamiland has been cleared for crops (dark brown areas). Much of this land has been abandoned because the soils are no longer sufficiently fertile. About 26,000 hectares had been cleared in Kavango in 1943, 72,100 hectares in 1972 and 194,500 hectares in 1996, an average annual rate of increase between 1943 and 1996 of 3.9%.<sup>8</sup>



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in Angola, such as Menongue, Kubango, Cuchi, Mumbué, Cuito Cuanavale and Chitembo. These and other expanses of cleared land show up clearly in the satellite image on page 16. Similarly, the many people living in the central highlands are responsible for the large clearings in the extreme north-west of the catchment. The large clearings in Angola are also due to the rapid rate at which land is cleared and then cultivated for four to six years before new fields are cleared. As more and more land becomes useless for crops, farmers have to search for virgin soils further away from their villages. Thus, farm workers in larger villages often have to walk 10 to 15 kilometres each day out to their fields and then back home again. Thirty and more years ago, fields were apparently re-used after rest periods of up to 20

years, but fallow periods now seldom last more than seven years because of the shortage of alternative cropland nearby.

This slash-and-burn, shifting cultivation is possible in Angola because soils suitable for crops are broadly distributed, and water is also fairly widely available. By contrast, most arable soils are close to the river in Kavango and the Delta in Ngamiland, and there is little water away from these areas. The majority of people are therefore concentrated close to their fields, although some Kavango farmers have cleared new fields far south of the river where borehole water has recently been supplied. The many other farmers who remain near the river and Delta simply have little chance of clearing new fields on unused soils, and they have to continue using fields that have lost much of their fertility. This is one reason why yields (see below) are so low, and one would expect that farmers would apply manure and/or fertilizers to their fields. However, efforts to boost soil fertility are very limited. Along the river in Kavango, only 2% and 8% of households apply fertilizers and compost, respectively, and only 16 – 22% of farmers apply manure to their fields.<sup>9</sup> Figures for Ngamiland are not available but all indications again suggest that fertilizers, compost and manure are hardly used.

### Variable success and high risks

From the account given so far it should be clear that this is not great farming country, mainly because most soils are poor in quality and rainfall is often in short supply. Crop productivity is therefore very low compared to that in most other areas of central and southern Africa. Conditions are nevertheless better in the northern areas of the Basin than in the south, a trend reflected by yields that are usually higher in the north. The only information known to us indicates harvests of between 500 and 700 kilograms of maize per hectare in Angola, more than double average yields of 100–160 kilograms in Kavango and Ngamiland. Smaller differences hold for millet: 250 kilograms per hectare in Angola versus 100–150 kilograms in Kavango and Ngamiland.<sup>10</sup> The other area where yields are high are on the *molapo* fields around the Delta as a result of the much more fertile soils (see page 44). One study found that *molapo* fields produced 2,100 kilograms per hectare versus 250 kilograms on nearby dry-land fields (the figure of 250 kilograms is higher than the averages given above, perhaps because the survey was done in a good season).<sup>11</sup>

*A government irrigation scheme overlooking Popa Falls.*



*Good harvests of maize require large containers, in this case a basket made of red bark on a sledge in Angola (top). The results of more modest yields can be carried home in a bucket (below).*



These average figures mask the high levels of variation from year to year that are characteristic of the area. Some seasons see good yields as a result of abundant, well-spaced rainfall and few pests, while in other seasons the yields are so low that farmers do not bother to harvest. Over and above problems of poor soils and rainfall, crops also face damage from diseases, insects (such as locusts), and birds (redbilled quelea finches). Elephants and other wildlife may be a problem in certain areas.

Except for *molapo* fields, crop farming in the southern Basin is apparently an unproductive business. But it is also true that yields would be higher if farmers made more effort, for example by fertilizing the soil, weeding more often, and fencing off their crops. Why should crop farming be so unproductive? One answer may lie in the idea that crop farming evolved over hundreds of years as something of a secondary, somewhat complementary activity. This was because farming was practised in an area where there was a relative abundance of other foods in the form of fish, wild fruits and animals to be hunted. With such alternatives there

would be little need to invest heavily in crops, especially if the risks of failure were high, rewards from selling or bartering surpluses were low, and a high burden of disease meant that people could not work harder. Under these conditions it was perhaps prudent to invest less effort in crops and more effort in obtaining other foods. The availability of most of these

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Harvests are often stored in large constructions made from poles, grass, reeds or papyrus and sealed with mud and dung. These storage huts are in Kavango (left) and Angola (right).

other foods has decreased, of course, but the decline has been compensated by new cash incomes with which to buy food, at least in Kavango and Ngamiland. The value of crops was thus first overshadowed by food from the bush, and now it is surpassed by food from shops and markets.<sup>12</sup>

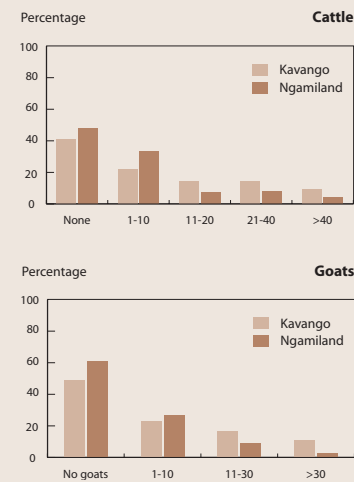
### Livestock: income or security

Much of this chapter has concentrated on crop farming, an activity practiced by most rural households. Field sizes, crops and harvests vary from farmer to farmer but the variation is nothing like the huge differences between households when it comes to livestock farming. Figures for Angola are not available, but it is clear that a tiny proportion of farmers have cattle, perhaps less than 5%. (Almost no information is available for livestock farming in Kavango and most of the material below refers to Kavango and Ngamiland.) Roughly half of all households have cattle or goats in Kavango and Ngamiland. Of course, half of all rural people therefore have no access to benefits from these animals (Figure 46). The same is true for other animals, such as donkeys, sheep and pigs: some people own these animals, many others not at all, and amongst those that are livestock farmers there is great variation in herd or flock size. In general, wealthier farmers with large households have the biggest numbers of cattle and goats, while poorer households have no livestock.

Cattle and goats are much more abundant compared to pigs, sheep and donkeys. It is hard to estimate the total number of animals in and immediately around the

river system because no information is available for Angola. However, there may be about 150,000 cattle and 140,000 goats in the Basin.<sup>13</sup> Most Angolan cattle are in the southern half of the catchment apparently because various diseases, especially those carried by ticks, limit cattle farming in the northern catchment. There are thus few cattle even though there are many more farmers than in the south. Many Angolan families also lost their cattle to pillaging soldiers during the last few decades of strife. Perhaps animal numbers will increase as life returns to normal.

Before the drilling of boreholes most animals were concentrated close to the river system in Kavango and Ngamiland. Nowadays there are large herds to the south of the river in Kavango and south and west of the Delta in Ngamiland. These animals are either kept at cattle-posts in open communal or tribal areas, or on large fenced farms allocated to individual farmers (see below). Cattle numbers in both countries have increased greatly over the past 100 years, largely as a result of better control of diseases and an increasing number of relatively wealthy people acquiring herds. However, there have also been several sporadic and temporary declines, particularly after the very dry years in 1986–1987, 1992–1993 and 1995–1996 in both countries (Figure 47). The most notable decrease occurred after the 1995 outbreak of lung sickness (or CBPP, Contagious Bovine Pleuropneumonia) in Ngamiland where a total of 320,000 cattle were slaughtered early in 1996 to control the outbreak. Numbers have since increased as people have slowly built up their herds.



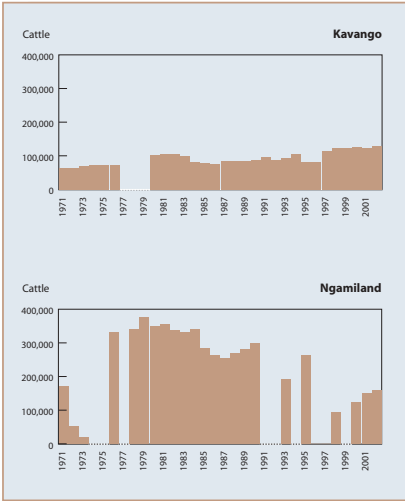
**Figure 46**

Livestock ownership is extremely unequal, as shown in these graphs for cattle and goats. Thus, 41 and 48% of all farmers have no cattle in Kavango and Ngamiland, respectively, and 49 and 61% of farmers do not have goats in the two areas. The majority of farmers that keep cattle or goats have only small herds or flocks, and only a small proportion of people have really large numbers of animals.<sup>14</sup>

Goats and cattle dominate livestock farming in the Basin.



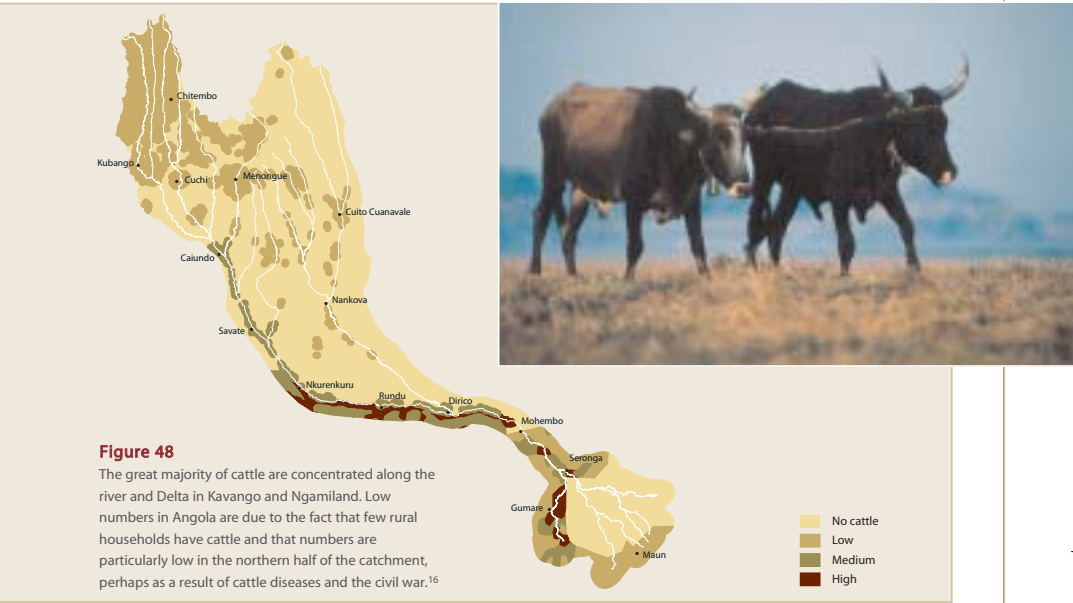
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**Figure 47**  
Cattle numbers have been increasing in Ngamiland and Kavango over the past several decades, although there have been several declines as a result of prolonged periods of low rainfall, for example in 1987 in Ngamiland and 1995 in Kavango. All cattle were eradicated in 1996 in Ngamiland to control an outbreak of lung sickness. The figures are for the whole Kavango region and Ngamiland district, since separate figures for numbers close to the river system are not available. We think, however, that most increases occurred away from the river and that livestock numbers have been rather constant close to the Okavango and Delta. Dotted lines show years for which data are missing.<sup>15</sup>

The outbreak of lung sickness had a great impact on cattle farming in Ngamiland. The main reason for slaughtering so many cattle in 1996 was to eradicate the disease and thus protect other cattle to the south in Botswana. Failure to take this action could have resulted in beef exports to European markets being stopped, causing a major loss of earnings for Botswana. Meat exports are also major sources of income for Namibia. Foot-and-mouth is another disease that may occur anywhere in the Basin. Again to protect foreign markets, all animals exported from Namibia and Botswana have to be protected against any possible contact with foot-and-mouth. Claims are often made that Angola is the main source of infection for lung sickness and foot-and-mouth, and that movements of cattle from Angola into Kavango help introduce the diseases further south.

Whatever the cause of infection, disease control in Namibia and Botswana is serious business. Both countries use several measures to control lung sickness, foot-and-mouth and other diseases. The first consists of vaccination campaigns conducted in both Kavango and Ngamiland against foot-and-mouth, lung sickness, blackquarter, anthrax and brucellosis. A second measure is the series of fences to prevent or control the movement of cattle (and all other large mammals, both domestic and wild) from moving south of the 'vaccination zone' (Figure 49). The fences have stopped the movements of large game in Botswana, causing the death of many animals and, as a consequence, frequent protests by environmentalists. Other fences have been erected within Ngamiland to contain the movement of cattle in case of an outbreak of disease, and also to stop contact between cattle and buffalo in the Delta. This is the main purpose of the so-called northern and southern buffalo fence. Herds of buffalo that occasionally stray out of the Delta are driven back using helicopters.



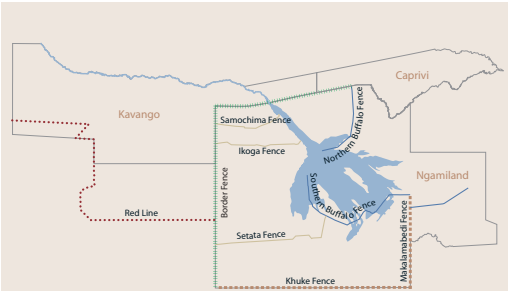
The last major collapse of cattle numbers before the 1996 eradication programme was in 1897 when the great rinderpest epidemic apparently killed most cattle. Large numbers of wildlife were also killed by rinderpest. An interesting consequence of this was that tsetse fly largely disappeared from Ngamiland over two decades. The flies suck blood from cattle, other animals and humans and, by doing so transmit sleeping sickness to people and trypanosomiasis to cattle (see page 123). Although few cattle contract this disease these days, it remains a serious potential threat to cattle farming.

Livestock bring a range of benefits to people fortunate enough to own them: draught power provided by oxen and donkeys, milk, leather and meat. However, for many farmers their main benefit is in providing security and investment values, much like other people put their savings into property, shares or investment accounts. This is not surprising in semi-arid areas where crop farming is so unreliable, and where livestock are much less vulnerable to shortages of rain. Little labour is required to look after animals, and returns from time spent on labour for livestock are greater than returns from crops. Animals are also a ready source of cash when money is needed to buy household goods and food when crops fail, and to cater for special family needs.

Investing in cattle is particularly important for farmers who are relatively wealthy as a result of good wages or earnings from businesses. Many of these farmers (usually 'weekend farmers') in Kavango and Ngamiland have acquired large herds and ranches away from the river and Delta. Examples of these are the TGLP (Tribal Grazing Land Policy) ranches in Botswana, and the Mangetti and other farms allocated by tribal Land and Farming Committees in Kavango. Some of these farms were given out to reduce pressure on communal pastures and with the hope that the farmers would manage their herds on a commercial basis. However, rates of selling are way below these expectations, and off-take rates in both countries remain low, as indicated by these figures:

Annual off-take of cattle, goats and sheep sold in Kavango and Ngamiland. <sup>17</sup>		
	Kavango	Ngamiland
Cattle	7%	7.4 – 12.8%
Goats	8%	6.5 – 12%
Sheep	No information	5.7 – 13.1

OKAVANGO RIVER



**Figure 49**  
A series of fences divide up Ngamiland and Kavango to control the movement of cattle and other animals. The 'red-line' fence in Namibia and the Khuke and Makalamabedi fences in Ngamiland are veterinary fences to separate the northern vaccination zones from southern ranching areas, while the two buffalo fences prevent contact between cattle and buffalo in the Delta. Border fences prevent cattle movements between Namibia and Botswana. The Samochima, Ikoga and Setata fences are intended to contain cattle movements in the event of an outbreak of lung sickness or foot-and-mouth. All these fences additionally help control the spread of other contagious diseases such as bovine tuberculosis and brucellosis. The fences restrict the movements of wildlife, and this has led to fierce protests and debate on whether the benefits of controlling livestock diseases outweigh the damage done to wildlife.

Two thirds of Kavango cattle sales go to informal markets while the other third is sold to MEATCO (a commercial meat processing enterprise). The highest off-takes in Ngamiland occurred in the driest years, presumably because animals were sold that might otherwise have died or suffered from shortages of grazing. Farmers often argue that they would sell more cattle if controls restricting sales south of the veterinary cordon fences were lifted. It is usually the owners of large herds that argue this apparently logical point. However, sales in Kavango did not increase when prices offered north of the Red Line were increased to comparable amounts paid elsewhere in Namibia. Most animals sold in Kavango also belong to people with small herds, while those with large herds make few of their cattle or goats available for sale. Despite all of this, one might expect that the growing cash economy would oblige farmers to sell more animals to provide them with additional cash.

Changing lifestyles

Rural livelihoods have changed greatly over the past 100 years, and the changes continue in more rapid, complex and varied ways than we often recognize. Most changes were introduced by colonial influences that brought new values and aspirations associated with religion and education, longer lives as a result of health care, and cash incomes from migrant labour and government jobs. Just 75 years ago, few people had any schooling and most had never benefitted from modern medicine. Not many people had seen or heard of sources of energy such as electricity, gas or paraffin, and there were very few cars or roads, and no public telephones. There was little experience in having cash incomes or in buying food, and most people were wholly and directly dependant on resources offered by the natural environment.

In Botswana and Namibia, developments that improved the lives of people continued after independence. Some of the most significant changes were those making urban jobs and businesses much more lucrative than rural farms. Enormous attractions and pressures encourage people to abandon lives as rural farmers, and many people have responded by moving to Maun, Rundu and urban centres outside the Basin. By contrast, rural people in south-eastern Angola have been through three recent decades of hostile upheaval: whole villages abandoned and destroyed (see page 58), and many men and young boys wrenched away by the armed forces. Many fields could not be tended properly for fear of anti-personnel landmines. Most of the few schools and clinics in Angola closed down. New changes now confront many Angolans: to find jobs as economic activity picks up or to become rural farmers, often in new villages around which they must clear new fields.

Livelihoods have also changed because of a loss of natural resources, mainly as a result of reduced material incomes from hunting, fishing and the gathering of resources from wild plants, such as fruit. A hundred years ago there was abundant wildlife, probably comparable to the numbers of hippos, lechwe, giraffe and other mammals now seen only in the Mahango and Moremi Game Reserves and in parts of the Delta (see page 114). Reminders of successful hunts in the past are embodied in traditional poems and songs that pay tribute to hunting forays in Kavango. Fish populations along the river between Angola and Kavango have declined (see page 100). Crop yields may also have dropped, especially along the river and around larger towns and villages in Angola. The

repeated use of fields, with little use of fertilizers, manure or compost to replenish soil nutrients, has meant that soil fertility has declined. The growing number of people has also limited the area in which new fields can be cleared. Overstocking has led to the loss of pastures. In Kavango, there has also been a decline in incomes from livestock because there are now far fewer cattle in relation to the number of people than before.<sup>18</sup>

Household welfare, and new incomes

Most rural homes look rather similar, and this is one reason why it is often assumed that the majority of rural people live and subsist in similar ways. However, rural households vary greatly in overall wealth. Each household also depends on a different mix of incomes from agricultural holdings (livestock and fields), natural resources (grazing, water, fertile soils, and fish) and cash sources (wages, business earnings, remittances and pensions). A few figures on ownership and access to assets confirm the high degree of variation between households. For example, cattle are owned by a tiny proportion of homes in Angola, 59% of households in

Kavango and 52% in Ngamiland. In Kavango, approximately 6% of all farmers own about half the cattle in the region, and about 270 people effectively own almost one quarter of all land in Kavango.<sup>20</sup> About 31% of homes in Ngamiland have no livestock of any kind.<sup>21</sup>

Many households have several different incomes, and even individuals often have several incomes as well. The following table shows that farming activities generate less than one fifth of all rural income in Kavango. Different kinds of employment, by contrast, provide almost two-thirds of an average household's income. The same study found that the annual income of a home in which one or more people were formally employed was seven times greater than that of a household in which no one was working elsewhere.

Percentages of total household income from different sources in Kavango.<sup>22</sup>

Source	Percentage of total income
Crop production	10
Livestock	8
Non-agricultural resources	19
Non-government employment	50
Government employment	14
Total	100

Note: Non-agricultural resources include goods such as fish, wood, etc.

*Fishing has been serious business for a long time. Charles John Andersson, the Swedish explorer and so-called discoverer of the Okavango River, wrote in 1861 'many of the natives devote a considerable portion of their time to fishing, and employ various simple, ingenious and highly effective contrivances for capturing the finny tribe'.<sup>19</sup>*



A different way of looking at household incomes is to ask what activities provide the main source of income. The following table provides such information for Ngamiland. Farming is the most important source of income for half the homes, while cash incomes from wages, salaries and small business activities are most important for 31% of households. The survey was conducted in 1997 when many households were receiving government assistance following the lung sickness eradication of cattle in 1996.

Percentages of total households having different main sources of income in Ngamiland.<sup>23</sup>

Source	Percentage of total income
Farming	50
Wages and salaries	25
Government assistance	16
Small business	5
Remittances	4
Total	100

Rural people could be expected to grow the great majority of their food. This is true in Angola where few rural people have jobs or businesses, but a survey found that farm produce (cereals, milk and meat) made up only half of the value of food consumed by rural homes in Kavango.<sup>24</sup> The other half was bought with cash. Cash resources have another great value: they open up a range of possibilities from which people without cash are totally excluded. Having cash allows you to pay for transport, school fees and uniforms, medical care and food, not only luxuries but also staples when your crop fails. Not surprisingly, there are great pressures on people to get a job or earn a business income. Much of the pressure is on young people who are urged to leave home in search of a job in Huambo, Menongue, Maun, Rundu, Luanda, Gaborone or Windhoek, for example. These are the places many people now go to, and where their children will want to be in the future.

In essence, most people are not keen to be rural farmers. And yet most plans for development in the Basin concentrate on rural development. Some plans seek to provide social services and infrastructure while others attempt to improve household economies. The latter largely concentrate on raising production on small farms to enhance food security and increase

sales of farm products. All these efforts are founded on the assumption that rural livelihoods can really be improved. We think this assumption is dangerous, for the following reasons:

- Promoting rural, subsistence livelihoods simply runs against the aspirations of most people.
- Rural life in most areas is hard and insecure because of poor soils, low and unreliable rainfall, and the prevalence of disease. Services are also hard to come by.
- Making a good living in this environment requires much more than the few hectares most people are expected to have.
- There are few markets where farmers can sell their products to make some kind of reasonable income.
- Finally, capital is required for effective, lucrative farming activities to develop. Small-scale farmers seldom have access to savings and their insecure tenure and meagre assets make it difficult to get loans.

These are all reasons that make rural development difficult, especially for subsistence farmers who face high risks and low rewards, and have better options elsewhere. For the time being, however, many rural people have little immediate hope of moving up the economic ladder, remaining stuck on the bottom rung where they eke out a living from farming, fishing and gathering. Compare these rural poor with people who have entered the modern economy, mostly as wage earners working as civil servants or businessmen. These are the Basin's 'movers and shakers' people setting the pace by taking command of much of the economy and the land. It is this 'elite' group who will determine much of the Basin's future.

People remaining as poor rural farmers should obviously not be abandoned. But efforts to support them will be more effective if they are appropriately cast in terms of poverty alleviation rather than as rural development. Effective development can then concentrate on urban areas and those options that recognize and capitalize on real benefits to be gained from rural environments, for example large-scale farming, tourism and the economic use of wildlife.

Farming and household livelihoods in three countries

Factors that affect farming practices and household livelihoods differ in many ways in the three countries. The following offers a comparative summary of the main features in the Angolan provinces, Kavango and Ngamiland.

Angola

Perhaps the best argument for trying to raise the development of rural people can be made in Angola where the great majority of people live in rural areas and depend heavily on agriculture for food. Luckily, Angola also offers the best conditions for crop farming. Most farmers grow maize as the principal staple food, with manioc and millet as supplements or, in certain areas, as the dominant crop. A great variety of vegetables, sugar cane and bananas are also grown. Many maize fields and vegetable gardens are, respectively, cultivated in floodplains and small valleys with rich, damp soils. Compared to most other areas in the Basin, the variety of crops is much greater, yields are higher, the soils are more fertile and hold more water, and higher rainfall over longer periods makes crop farming more flexible and less risky. Most people live in villages and tend surrounding dry-land fields, very few of which are fenced. Once fields have been used for several years, farmers clear new fields further from their villages because there is a relative abundance of water and soils suited to arable agriculture. Very large areas of cleared land therefore now lie abandoned. The few farmers with cattle live mainly in the southern parts of the catchment. The combined effects of decades of strife, insecurity, displacement and landmines (many surrounding villages) combine to present rural Angolans with enormous challenges.

Kavango

Much more information on farming and livelihoods is available for Kavango and Ngamiland than for the Angolan catchment. Although almost all rural people in Kavango engage in farming activities in Kavango, the value of incomes from crops and livestock are much lower than those they derive from wages, business earnings, pensions and remittances. Many households thus have family members earning incomes away from their farms. Millet is the predominant crop grown on fields of several hectares per family. The millet is mainly grown on sandy soils that are poor in nutrients. Some people tend small patches of maize and sorghum on low-lying clayey soils, but farmers do not use seasonally flooded areas for crops. Most fields are close to their owner's household, and a shortage of unused land with suitable soils means there is little chance of clearing new and better fields once soil nutrients are depleted. Yields of millet, maize and sorghum are very low, averaging 100 – 160 kilograms per hectare. Insufficient and badly timed rainfall, poor soils and a lack of effort to improve crop growth are the main reasons for such low yields. Approximately half of all households have cattle and goats, but less than 10% of these animals are sold each year, mainly because livestock are largely valued for the security and investments they bring to farmers.

Ngamiland

Farming conditions here are rather similar to those in Kavango: millet is the main crop on dry-land fields, many households have sources of cash income that exceed the value of farm earnings, roughly half of all homes have cattle and goats, sales of livestock are low, most soils are sandy and poor in quality, and farmers have little chance of finding better, unused areas on which to clear new fields. Millet crops also often fail as a result of shortages of rain. However, many farmers have *molapo* fields in seasonally flooded lowlands where the soil is fertile. Maize is the main crop and yields are much higher than on dry-land millet fields. Overall, farming appears to be taken more seriously than in Kavango: weeding is more frequent, most fields are fenced, and government subsidies and controls are more substantive. All cattle in Ngamiland were slaughtered in 1996 as part of a programme to control an outbreak of lung sickness. This and foot-and-mouth disease are controlled by veterinary fences and annual vaccinations in both Ngamiland and Kavango.

Key points

- The great majority of the 60 to 70 thousand rural households practise small-scale farming in the Angolan catchment and around the river in Kavango and Delta in Ngamiland.
- Most poorer subsistence farmers are in Angola, whereas many rural farming households in Kavango and Ngamiland also have cash incomes from other sources that far exceed the incomes they obtain from farming.
- Rainfall is higher and soils are generally better in Angola than elsewhere, and more maize, manioc, and vegetables are grown there than to the south where crops are dominated by millet.
- Livestock farming becomes progressively more important from north to south, and from the wettest upper catchment to the most arid areas around the Delta.
- Yields are higher in Angola than to the south where low and badly timed rainfall often makes crop farming unproductive and risky.
- Crops are only grown on rich soils in seasonally flooded areas close to the river, its tributaries and channels in Angola and Ngamiland.
- Farmers in Kavango and Ngamiland have little access to areas with good soils on which new crops can be grown, whereas Angolan farmers often move on to clear new fields once their fields have been used for several years.
- Lung sickness and foot-and-mouth disease may occur anywhere in the Basin. Veterinary fences and vaccinations in Kavango and Ngamiland control these and other diseases from spreading into areas from where meat is exported.