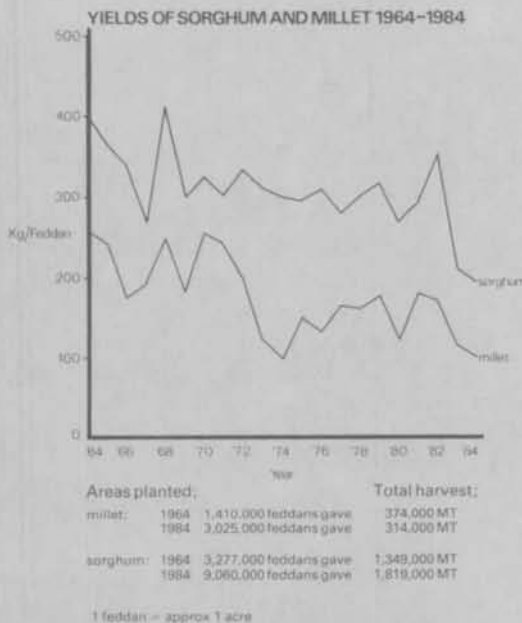


Land:

High pressure, diminishing returns



(Source: Min of Ag & USAID)

SHARP CHANGES IN THE WAY traditional farmers work are helping to destroy the soil across much of Sudan causing crop yields to crash.

Instead of rotation systems that conserve and regenerate the land to ensure continued returns, there has been much more intensive farming and use of more marginal soils with lower rainfall. Both actions damage the soil and have been among the factors causing crop yields to fall — which restarts the vicious circle, as farmers compensate by cutting down more trees and clearing more land.

The changes have come from both need and greed. Increases in numbers of people and animals have added greatly to the pressures on land, drier weather in the last 20 years reduced the harvests, while the debt which followed encouraged farmers to aim for a faster return.

Wider and more intensive use of land in recent years has also occurred when outsiders with money or wealthier villagers started employing others to grow and harvest crops for profit. Like large-scale irrigation or mechanised farming, this widened the use of land beyond the natural limits of the area each family could cultivate, gave far less incentive to use the land carefully for long-term conservation, removed poorer people from their own land at exactly the time when their crops would need the most attention and widened the gap between the wealthy and the poor.

Cultivation of cash crops — cotton, peanuts and tobacco — and sales of food crops — sorghum and millet — have expanded since independence, as improvements in transport, such as the roads in the east or the railway in the west, made cash sale a far wider possibility.

As population expands, there is less and less 'good' land — usually the land in or close to the bed of seasonal rivers — available, so people must try to grow food on the poorer soils. The increasing number of people migrating across Sudan in the last few years — because of poverty or drought or both — will be the last to move into any village and will usually get the worst land.

Sudan's soils are often fairly poor, with low nitrogen and phosphate content, and are easily damaged if not carefully managed with long fallow periods. Some are basically old sand dunes covered with a thin layer of topsoil. Without a covering of plants, the soil blows away and the sand begins to spread, and very little creeping sand is needed to ruin good fields.

... but it's a big country – what does it matter if a farmer cuts down some trees?



Caroline Penn

Nomads' camel herd grazes on gum arabic trees

Trees:

Fuelling the crisis

A Cautionary Tale : Gum Arabic

Faced with erosion, falling yields, wood shortages, more livestock and rural poverty, a country like Sudan might hope for something that would stabilise and fertilize the soil, produce wood and fodder, and make a profit for farmers.

Acacia senegal already exists, a low tree that exudes the sticky 'gum arabic' and Sudan controls most of the world supply used by the chemical, brewing and food industries. The Government is also doing its inadvertent best to accelerate the already enormous destruction of a plant that must be a part of any attempt to limit desertification.

As a leguminous plant, 'fixing' nitrogen from the air into the soil as fertilizer, the gum arabic tree is a vital part of a carefully balanced rotation system used by small farmers. The trees on uncultivated land are cut back while the ground is cleared and sorghum or millet are planted for about five years. Then the gum arabic trees are allowed to grow for 15 years while the gum is collected. Adult trees are felled and smaller ones cut back to start the cycle again when the regenerated land is ready for crops.

While the increasing pressures on land from farmers and nomads have limited cultivation of the gum arabic tree, price has also had a large influence.

Gum arabic returns to the individual farmers have declined by comparison with sorghum, millet or peanuts, and the gum crop — which needs some care year round — has suffered because people can make more money by migrating for work on agricultural schemes.

Leaving aside *shell* (see p.16) which affects all crops, gum arabic's system of sale, with a public corporation controlling trade, running the Government auctions and setting minimum prices, allows even less to reach the farmer. Merchant cartels at the auctions ensure prices stay low while the Government, despite its professed intention of expanding the trade, manages at various stages to extract seven separate taxes or dividends out of the price, and to manipulate the foreign exchange rate used in gum transactions to its advantage.

Even those poor farmers aware of the potential environmental damage have little choice when a crop has poor and declining profits; the trees will be cut down and millet or sorghum planted instead. This has been going on for decades but accelerated during the drought. In 1984, it was estimated that a farmer could make three times as much money by turning his gum arabic trees into charcoal for sale as fuel, as by harvesting the gum. The trees come down, soil erodes, yields fall.

Fluctuating supplies have encouraged gum arabic's customers to find alternatives, synthetic and natural. If Sudan's Government wants to avoid strangling the gum trade, customers must be guaranteed good supplies of high quality. To do that requires the Government cutting its take, deliberately putting more money into the poorest farmers' pockets, and guaranteeing demand and price for a long period. This could also strongly help Sudan resist desertification.

EVERYONE IN SUDAN uses trees but almost no-one plants them. The loss is huge, and far more than can be sustained.

Large areas around towns have been stripped of trees, and the latest drought only increased the destruction, as nomad's herds grazed on trees when the grass ran out, and poor people burned trees to make charcoal, which they could sell as fuel.

The average family in north Darfur uses almost 200 trees or large shrubs every year, according to a study of desertification by a Sudanese researcher, Professor Fouad N. Ibrahim. Vast numbers of trees and shrubs are also eliminated on the large plots of the mechanised farms, often by being uprooted and burned.

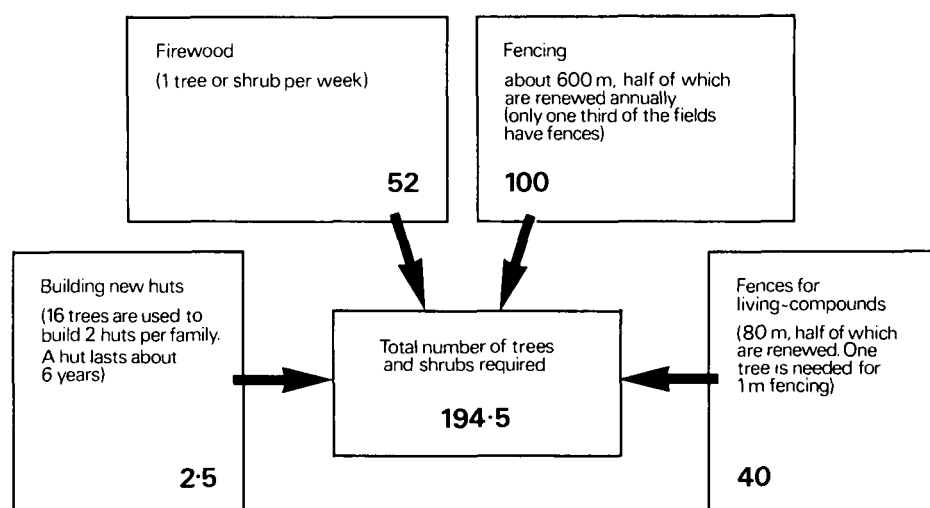
The loss of trees is crucial since they perform a multiple role in poor agricultural societies like Sudan, providing food for humans and animals, building materials, fencing and firewood, but also securing the soil, sometimes fertilising it by 'fixing' nitrogen, providing shade, acting as windbreaks and improving the 'microclimate' for crops nearby.

More intensive farming, with the loss of rotation systems, particularly those involving the gum arabic tree, has removed easily available wood, and put more pressure on other trees over a far wider area.

Loss of woodlands as part of the overall environmental decline has also led to the almost complete disappearance of wildlife over wide swathes of Sudan. Land clearance for irrigation schemes or mechanised farming eliminates animal habitat, as does the enormous destruction of trees for firewood, while the overstocking of camel and cattle herds brings far greater competition for increasingly scarce grazing and open water.

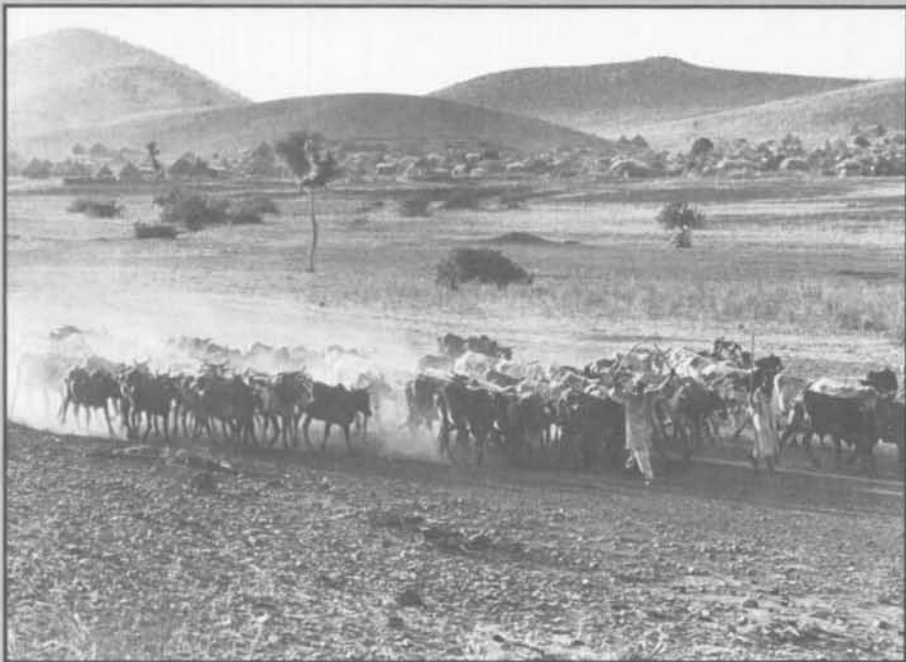
In the north, older people recall how areas which are now sandy grasslands turning into desert, supporting only gazelle, were savannah woodlands 20 or 30 years ago where giraffe, zebra, elephant and lion could be found. Loss of wildlife is another clear symptom of Sudan's crisis, and also one more factor limiting the options of the poorest people by removing sources of food and income.

Annual wood consumption per family in northern Darfur

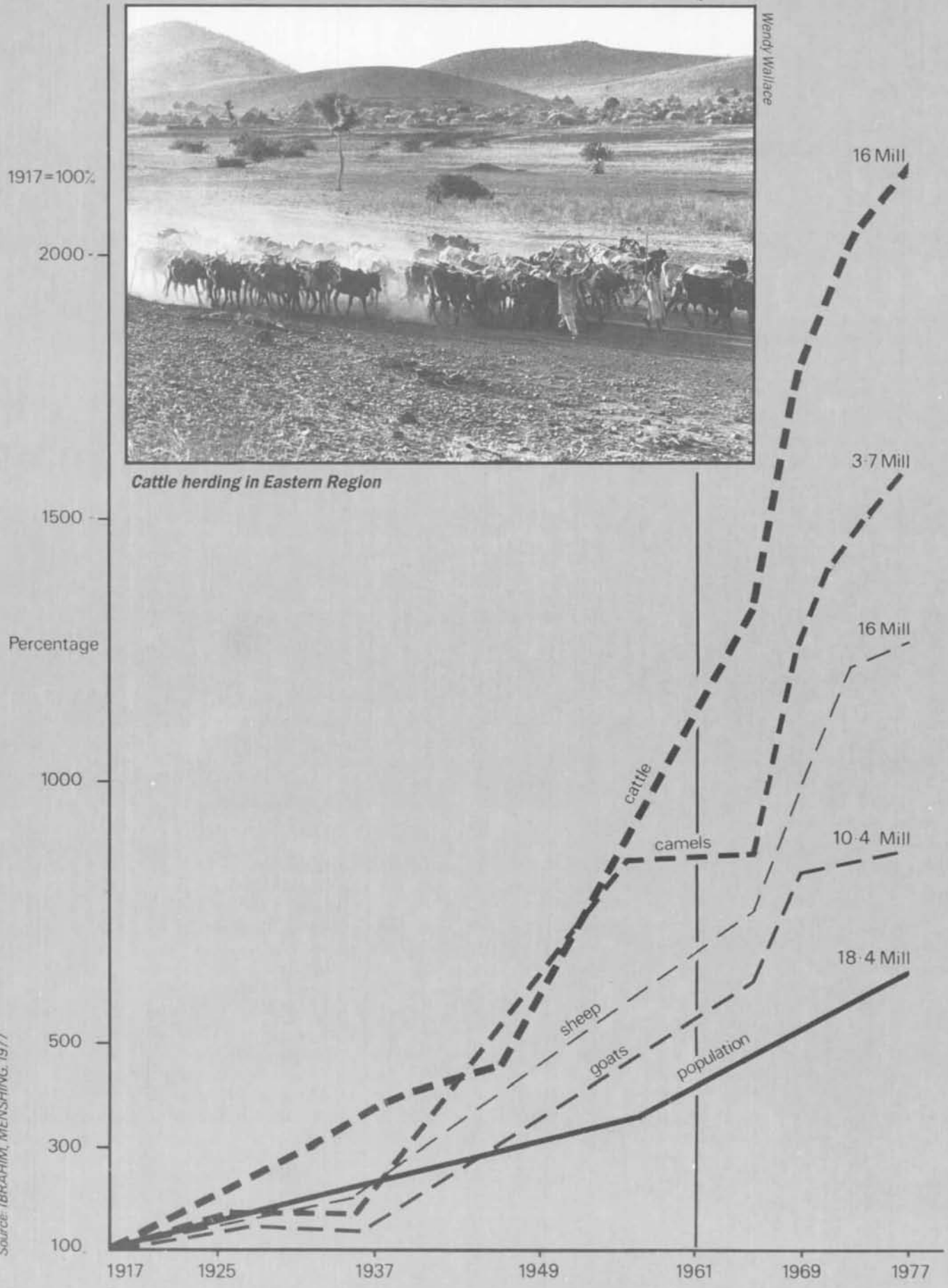


Source: IBRAHIM 1979 b

**... but fewer trees must mean more
land for grazing?**



Cattle herding in Eastern Region



Livestock:

Too much of a good thing

FOLLOWING A FALL IN NUMBERS at the end of the 19th century because of the disease rinderpest, the population of animals — camels, cattle, sheep and goats — has greatly increased, particularly in the last 20 years.

Both nomads and settled farmers have animals: some nomads have settled near boreholes with large herds, and people in towns and merchants invest in livestock kept with relatives or nomads.

In a country with few rural investment opportunities, animals make good sense, being both productive items — yielding milk, meat, fleece, leather — and self-replicating stores of wealth, particularly since grazing and water — as public resources — are free or very cheap, while the animals, products and profits are private.

In both the short and the long term there are pressures for animal numbers to rise. Nomads have a long-term strategy of maximising the size of herds since this will both satisfy their immediate needs and, equally if not more importantly, minimise the risk of total loss in a bad period, thus ensuring survival.

In good years, there is a short-term pressure to increase numbers because water and fodder are more easily available and cheaper, so there is an impetus to purchase animals. Prices rise as animal quality improves and demand increases, while the cost of other food needed by nomads, such as grain, falls, so they do not have to sell as many animals to satisfy basic needs.

In bad years, forage, water and therefore animal quality decline while other food prices rise, forcing nomads to sell more animals to supply basic needs and satisfy their requirements for money; but in bad years selling is usually delayed as long as possible in the hope (entirely reasonable in Sudan's erratic climate) that next season will be better.

Thus nomads do appear to reverse conventional western economists' theories about people selling when prices are high and buying when they are low — and they also do not easily follow the outside pressures of the Sudanese Government and aid donors to increase the percentage offtake from herds, though they certainly take advantage of any assistance or services for livestock, such as vaccination campaigns.

Among the factors helping to increase livestock numbers have been better veterinary services, increased meat prices internally and for export, far wider provision of boreholes for year-round grazing, several long spells of good rain since the turn of the century and the more recent extension of the railways to ease transportation.

Estimates based on a livestock survey by the Sudanese Rangeland Management Authority suggests that the number of animals nationally reached more than 50 million by the summer of 1984, a lot more than the land could feed in the long term. This overstocking was not even. The south's animal population was far below carrying capacity, but Darfur, Kordofan and Eastern region — all areas of desertification, bad drought and severe famine — had far higher overstocking levels.

The sharp rise in numbers has happened at the same time as big irrigation schemes and the large mechanised farms have cut into nomads' grazing areas and migration routes, while their normal strategy during drought would be to range ever wider in search of water and grazing.

As drought affected already overgrazed grassland, nomads and settled farmers cut down trees for animal fodder, accelerating the processes of erosion. The lack of foliage, and thus flowers, has shown up in another way — some areas of Sudan are said to have had a shortage of honey.

The drastic fall in numbers since 1984 was inevitable when grazing replaced water as the ultimate limiting factor on numbers; the animals, like the people, died of starvation and disease, not thirst.

... but couldn't the nomads find some good land and settle their animals on it?



Caroline Penn

Families on the move in Darfur

Tenure:

Who owns Sudan?

OUTSIDE THE BIGGER TOWNS and cities, almost no land is 'owned' by anyone, in the sense of holding a legal, written title.

For centuries families and tribes have had rights over land if they used it, or their animals grazed it. Such rights could be inherited, but would be lost if the land was abandoned.

Allocation of land or disputes within a group or village were resolved by the local leader — sheikh or chief — while inter-tribal problems over land use, particularly by nomads, would be settled by negotiation or conflict.

As the colonial government imposed its rule, it set its own often arbitrary internal borders between tribes, favouring those it regarded as compliant, which has left a legacy of disputes.

Competing claims for grazing continue to require the attention of the Government up to very senior levels, and disputes can lead to bloodshed and killing. In April 1985, when the drought had sharply increased competition for the remaining grazing, an Oxfam worker in south Darfur reported even small children being brought into a hospital injured after a violent local land dispute.

The biggest problems have emerged with the large agricultural schemes, where the lack of a formal title to own or use land makes it very easy for the plight and rights of poor farmers and nomads to be virtually ignored.

From the enforced settlement of people displaced by flooding for dams in the north to the potential impact of the Jonglei canal in the south, the big schemes have clearly been launched without sufficient consideration for the people affected or the environmental effects.

In 1970 the then socialist-oriented Nimeiri regime greatly undermined the security of the rural population with the Unregistered Land Act, which laid down that any land not formally registered was the property of the State, legitimising the land-grabbing of the mechanised farming sector.

While Sudan does not suffer the common Third World problems of large private landowners exploiting the poor, Government ownership of land and the granting of leases to outside businessmen can hardly encourage a farmer or nomad to conserve the soil for long-term benefit.

... but can't people borrow money to get over a bad patch?

Sorting the grain for market.



Caroline Penn

Credit:

A lack of bootstraps?

Positive Points...1

A Little Credit Goes a Long Way

Near the railway line in south Darfur is a small village typical of the settlements on Sudan's sandy soils, where the people have few animals and cultivate relatively small plots of land. Most are poor and depend on the merchants and shopkeepers of the nearest town for work and loans.

The villagers' impoverishment results from the insecurities of rain-fed crop production. In poor years they are often so short of food and money just before the harvest that they raise cash by working on richer villages' farms. This makes some cash or grain, but restricts the time spent on their own crops, reduces the plot size and, particularly if drought and over-intensive land use are lowering crop yields, leaves them worse off overall.

Increasing poverty also forces villagers to mortgage their crops under the *sheil* system. Shopkeepers advance cash, seeds, food or consumer items before the harvest in exchange for part of the crop worth far more than the goods. More wage labour may be the only way to work off the debts.

Trying to end this cycle of poverty and debt, the village's religious leader and twelve poorer farmers formed a co-operative. The religious leader was creditworthy, so he got a personal bank loan and provided the enterprise with land.

Conditions were agreed: the men would work on the co-operative plot in the mornings, leaving afternoons free for their own plots; they could not be absent without good reason, but if they dropped out, they would be paid for work already done. After the crop was harvested and sold, costs would be deducted and the money divided. One half would be split between the men; the other would go to pay off the loan and finance the next season.

The most significant point was that part of the loan was immediately used to buy the food and consumer items the families would need during cultivation. By avoiding *sheil* or credit buying from merchants, the men had enough security to devote all their time to their own crops, co-operative and private.

They grew about 40 acres of millet and 20 acres of groundnuts. Yields were good and their joint production exceeded the total their individual plots produced in the previous year. For the first year for some time they ended up richer rather than poorer.

Unfortunately, the co-operative fell foul of disagreements about dividing the proceeds and did not last. But it proved that such a spontaneous initiative by a small and apparently powerless group could improve their security and income — if they could get credit. For at least one season the usually uncreditworthy poorest farmers broke free of the debt that stopped them ever receiving the full value of their labour.

The potential of such schemes has convinced several development agencies in Sudan to try to establish rural credit schemes for individuals and groups.

A LANDLESS FARMER has nothing to offer as collateral for loans to pay for agricultural improvements, better storage or merely food during the hunger gap before the harvest.

Sudan's financial system is entirely geared towards towns and businesses and away from the countryside and farming. Indeed, during the drought many banks encouraged speculation in grain to profit from rising prices, helping merchants to impoverish or starve their rural neighbours.

As well as simple shortage of funds for small borrowers, few attempts have been made to extend the services of banks into villages, despite potential demand.

It has been estimated that only 20% of Sudanese have the assets or income to get credit from a bank, and the growth of rural co-operatives for farmer's to help themselves has been very slow. A study by one foreign government's aid organisation suggested many co-operatives had long delays even in getting formally registered, because of local government inefficiency. The large gap is filled by *sheil*, an informal loan to a farmer from a local trader, who advances seeds, food or money before the harvest in exchange for a proportion of the crop.

Gross profits for traders making *sheil* loans are between 50% and 75% and the ease of getting into debt, particularly during drought, increases the pressure for crops which give fast returns and for the farmer to allow less time for land to lie fallow.

Sheil merchants want to be sure of getting their return. As drought worsens they are less and less likely to lend to the very poorest farmers, so those who do not have good land and cannot expect a good crop will get nothing and be the first to starve.

... but surely the marketplace ensures farmers get fair prices? ...page 20