

Managing agricultural transition in African drylands

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The African drylands are home to 268 million people, or 40 percent of the continent's population, and, excluding deserts, they comprise 43 percent of the continent's surface area. Frequent droughts, and other risks, threaten investors and producers. Poverty is widespread, and the numbers of poor people in the drylands are so large that they threaten to block the achievement of the Millennium Development Goals. Food insecurity and dependency on food aid occur frequently in some countries, because besides the risk of drought, agricultural productivity is low and the natural resources seem to be degraded (desertification). Development projects have often failed, and few governments have enough resources to support enlightened policies.

However, African drylands are not all the same – annual rainfall can be anywhere from above 1000 mm to below 250 mm. There are rivers and wetlands, many types of soil, differences in land use, and in roads connecting with markets. Large-scale policies have mostly not worked, mainly because they lack the flexibility that people need to survive and prosper in such regions. The often low and highly variable rainfall creates risky environments for households, but people have responded flexibly, adapting to their opportunities, and developing strong links with humid or urbanised regions. Economic activities are characterised by innovation and experimentation. People's knowledge is a valuable resource for managing risky environments, in contrast to the narrower understanding that introduced technologies are often based on, many of which have failed.

Transition in the drylands

Transition can be a lengthy process, and means that the production system, as well as related natural resources and livelihoods, will be organised and managed differently. It is the result of many factors – including long term changes such as in rainfall and economic growth, and the application of peoples' own internal resources of knowledge, skills, capital and labour. External interventions only form a part of this transition process, sometimes a small one. Because so many external interventions have failed, and because development assistance and governmental resources are stagnating or declining, it is essential to understand transition better in terms of how it affects resource users, and what practices they can manage in order to achieve more sustainable livelihoods. Farming is usually practised as one part of a family's livelihood along with other activities. However, for the reasons stated, "business as usual" is now not sustainable in the drylands. The aim of managing transition, therefore, is securing a sustainable livelihood under the conditions of uncertainty that characterise drylands.

Can dryland peoples, against the odds, accomplish the transition from being at risk of further degradation, to more sustainable livelihoods?

Dryland peoples have been contending with changes, often beyond their control, for as long as they can remember, and they must manage and adapt as best they can. The slow pace of their adaptation may not be noticed by outsiders. Data on such change

and variability over long periods –40 years or more– are now available in Africa. Taken with peoples' memories and indigenous knowledge, such long-term data can help identify policies (for the government) and practices (for the resource user) that can work in drylands. In the discussion that follows, examples are taken from recent fieldwork in the Kano-Maradi region of northern Nigeria and eastern Niger.

Managing environmental variability

In the Sahel region, average rainfall declined between the 1960s and the 1990s by as much as one-third. This meant that droughts were more frequent, crop failures caused food shortages, and animal mortality increased. The challenge was for people to increase their adaptive skills beyond what was needed before, to cope with added risk. Short-cycle early maturing crops and varieties took over from traditional longer-cycle varieties, and the use of wetland sites for dry-season cultivation was increased. Livestock numbers, too, increased on average, thanks to using grazing resources more flexibly, and shifting from cattle to small animals – a change associated with the ownership of small animals by women and sometimes children. In these and other ways, technological adaptations succeeded, on average, in maintaining the production of staple food crops per person at the levels of basic needs, despite the increase in the population.

Decision making under conditions of risk is not straightforward. The rains may begin at any time between April and July, and end without warning, which makes it difficult to assess best planting times and use of labour. In Kano, where there are two harvest seasons (early millet and the late crops, sorghum, cowpea and groundnut), if the rains finish early, labour inputs are relaxed for late weeding and the second harvest. In northern Maradi, where the risk of failure is greater, efforts are made to plant the largest area possible, but in drought years, large areas may later be abandoned without weeding or harvesting. In the worst years, technological adaptations in farming are not enough to compensate for lost crops, and decisions have to be made to migrate in search of alternative incomes (see Demographics below). In the past, three years' stored grain was considered to be a sound insurance; now, however, it is more common for the whole harvest to be consumed before the next one becomes available.

Managing productivity

So long as farming families prefer to grow their staple food (in this region, pearl millet and sorghum), every family tries to



Photo: Author

The Kano Close-Settled Zone at harvest time.

produce enough for their needs. When rainfall is satisfactory, farmers in the Kano Close-Settled Zone can grow their minimum requirements despite the tiny farm sizes. This is because they practise quite heavy manuring with organic residues, inter-cropping millet or sorghum with nitrogen-fixing crops such as cowpea or groundnut, and weeding several times during the short growing season, then feeding the cuttings to livestock. Fields are also ridged to preserve soil moisture. Where land is abundant and labour is scarce (in northern Maradi until recently), fallowing is used instead. If fallows become impossible because land itself becomes scarce, productivity falls, until intensive practices are introduced to reverse the trend.

It is not surprising, therefore, that staple crop yields tend to be higher in Kano than in northern Maradi (where they may often be less than 0.25 t/ha). This is not only due to lower rainfall (600-700 mm on average compared with less than 400 mm). Every farmer agrees that, given more manure, crop yields would be raised. Increasing productivity depends on having access to affordable inputs. One way of doing this is by keeping animals -either one's own or those belonging to nomadic herders- on the fields after the harvest (when they graze the crop residues). A farmer's own animals must be kept impounded during the growing season, while fodder is cut and carried to them at some expense in labour. Another strategy is to add value per hectare by switching to higher value crops on some of the land, or by planting and protecting trees.

Demographics

Until the 1990s, the rural populations of the Kano-Maradi region were doubling themselves in about 30 years. This means that each successive generation of every farming family has less land available to cultivate. There are two livelihood options: first, for adult sons to move elsewhere in search of land or other occupations, and second, to subdivide the holding into ever smaller portions and try to raise their productivity by more intensive methods, or crop diversification. In the Kano Close-Settled Zone, less than half a hectare of cultivable land is available per person living on the land, and people have been leaving for many decades. Because of lower rainfall and productivity of the land, farmers in northern Maradi feel threatened by a shortage of new land although each family has on average more than 18 ha. On the other hand, increasing numbers mean more family labour is available for working the land. Lower population growth may be expected in future, as the costs of having and raising children increase. There is evidence from Nigeria that this is already happening.

A critical part of the demographic changes in West Africa is urbanisation. The scale of urban growth has increased dramatically since 1960. For example, Niamey, which had less than 100 000 inhabitants in the 1960s, now has over a million; and 40 percent of Nigeria's population of over 100 million are

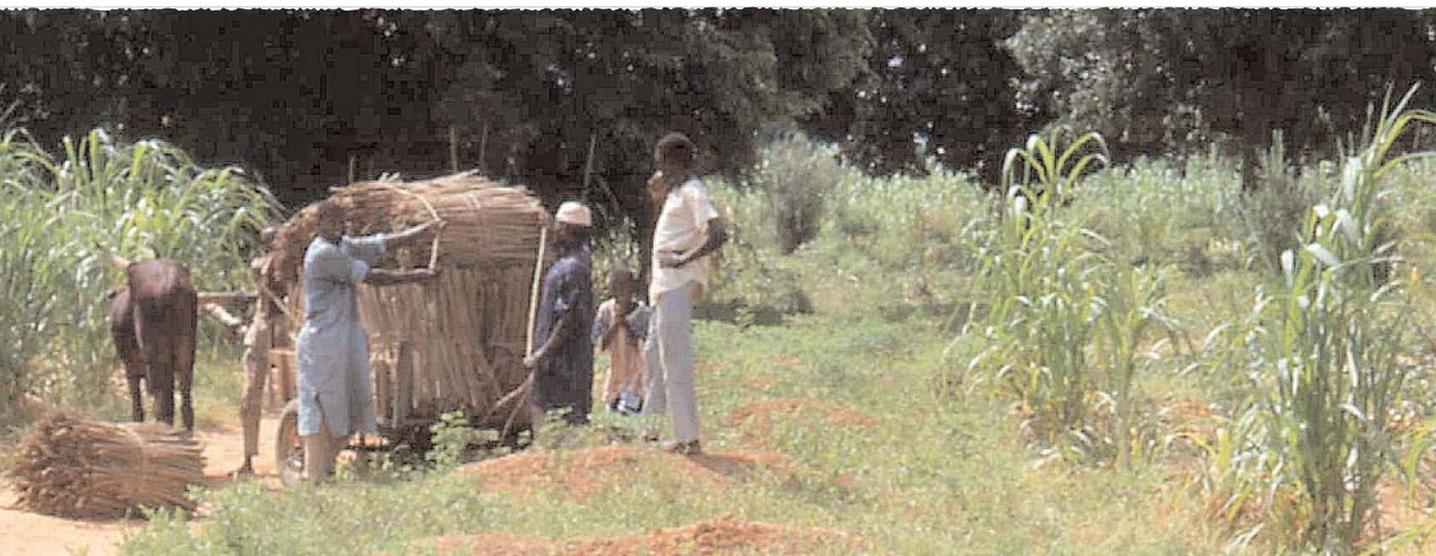
now reported to live in cities. In some areas, rural to urban migration has removed part of the labour force; but in the drylands, rapid increase has easily supplied urban migrants while not significantly reducing the land to labour ratio.

Increased conservation

This discussion shows that scarcity of land and inputs causes changes in people's management strategies. In the past, heavy grazing, cutting for fuel, as well as more land used for cultivation, meant a decrease in rangeland, woodland and trees (especially in open access areas), but now more conservationist attitudes towards biodiversity are being reasserted. Every farmer who was interviewed in Kano and Maradi agreed on the priority of conserving trees. Where clear felling used to be regarded as evidence of "good" farming in northern Maradi, protection now has social approval. The practice of *défrichement amélioré* is now common, protecting trees of economic value that regenerate naturally. This change has occurred within one generation, and has been promoted by development projects. In Kano, where projects had very little influence, trees have been protected for generations. The amount of timber growing on farms is often greater than that in adjacent woodland, measured in m³/ha. Even when tempted to sell wood to make up for crop failures, Kano farmers maintained the density of the trees on the farm. The village herbalists in particular value biodiversity, as they say "every tree provides a medicine", and are active in conserving individual species. Two of the villages which collaborated in this study (Magami in Niger and Dagaceri in Nigeria) identified tree nurseries as their priority for community action for conserving biodiversity, and invested their own resources in realising this opportunity. Even weeds are harvested in Kano villages for feeding to animals and -with crop residues- are exchanged in the markets.

Income diversification and marketing

Specialisation is highly risky in a semi-arid environment, and farmers have traditionally sought security in diversifying their enterprises. In the Kano-Maradi region, small-scale farmers entered global agricultural markets for the first time through colonial boards that were set up to promote groundnut and cotton production for export. Few producers were willing to take large risks, and so diversification was achieved by extending the area under cultivation. This option has almost gone (as explained above), and these global markets have all but disappeared with a drop in commodity prices and increased crop disease. Farmers have now diversified and are selling food commodities to local markets, and producing other crops, such as sesame in Kano and tiger nuts in southern Maradi. In both regions, livestock are shipped in increasing numbers to coastal cities. The markets for staple foods have grown. A study of Kano urban markets carried out in 2000 showed that the grain and livestock markets were supplying this city (with about 1.5 million consumers, compared



with 0.25 million in 1962). They had a key position in the national food commodity markets that even extended to Maradi.

Off the farm, improved roads and cross-border movements permitted under the Economic Community of West African States regulations, allow short-term migrants access to urban employment, hired labour markets, and more trading opportunities than before. Diversifying income sources thus depends on markets, whether for agricultural commodities, land, labour, or knowledge, and on mobility of labour and capital. In the Kano-Maradi region, nowhere is too remote to have some significant market linkages. It is important to support dryland people in realising income diversification strategies, and to facilitate their full participation in the regional market economy. Thus far, this has been achieved almost entirely without state support, and the contribution they have made to national economic growth has been systematically ignored by policy makers. Earnings from diversification are critical for the successful transition to more sustainable agricultural systems as they may be invested in farming, livestock, or natural resource conservation.

Facilitating transition

The point to stress is that all resource users are not in the same position. In the past, interventions (such as fuel-efficient stoves) have often been promoted irrespective of the variation in individual or household circumstances, where the innovation may not be needed by some or cannot be adopted by others because of constraints imposed by poverty, labour supply, gender or other considerations.

An approach to development that is gaining acceptance is that it should be “demand-led”. In the present context, this excludes promotional interventions based on new technologies prioritised by outsiders, in favour of placing the service provision sector at the disposal of local people who are facilitated to develop their own priorities. A framework such as that presented here, which puts people into context rather than the two simple categories, “adopter” and “non-adopter”, and recognises individual differences rather than relying on “averages”, can assist development field staff to organise the services they offer, in order to respond better to what people need. This will enhance the timeliness and relevance of the service provided to support agricultural transition in the longer term.

The available evidence suggests a sustained effort to increase the output of food in line with increasing consumption needs. This shows the ability of small scale African farmers in these regions to manage the transition to sustainable livelihoods under difficult circumstances, given certain conditions such as access to markets and integration of livestock. There is still anecdotal evidence of rural poverty and food insecurity in the Kano Close-Settled Zone, but these long term transitions suggest significant successes in ecosystem management, contributing to more sustainable livelihoods, and providing important learning experiences in the search for viable pathways to development. ■

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This article draws on work undertaken for the IUCN (World Conservation Union) Commission on Ecosystem Management's Drylands case study of the ecosystem approach.

The hard way to success

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In Nyandarua District, in the Central Province of Kenya, the main food crops are maize, beans, peas and potatoes, and dairy farming is practised by most farmers. After independence in the 1960s, the Kenyan government gave farms previously owned by colonial settlers to local people, through the Kenyan government settlement scheme.

The people of Subuku, an area of the district's Ndaragwa division, were settled through this process. Since they did not have machinery, they only cultivated small pieces of land rather than large fields, and yields were often unsatisfactory. Government policies did attempt to favour farming in these areas: a milk factory was built in nearby Nyahururu, for example, but this assistance was insufficient to support the area's needs as a whole.

After farming for several years, farmers began using fertilizers and pesticides in their farming, as the land was not providing enough food for consumption and sale, while the cost of living was increasing. At first, production rose. But after some time, it was noticed that these agrochemicals started affecting the soils, yields dropped and were of poorer quality. The agrochemicals also appeared to be a health hazard. High blood pressure, among other health problems, was increasingly experienced, and within ten years became common, especially in elderly people.

Livestock were also affected: milk production dropped so much that the milk factory closed down in the mid 1980s. The previously satisfactory road network was neglected and, resulting impassable during the rainy season, often the area became isolated. With the rising costs of farm inputs and reduced yields, many families could not pay school fees, or buy animal feeds. The government was not in a position to help the people.

In 1999, the Kenya Institute of Organic Farming, the Conflict, Development and Peace network, and other organizations, came to the area. They encouraged farmers to start kitchen gardens, growing fruit and vegetables for domestic consumption, to help with the families' health problems. They looked carefully at local conditions, and designed appropriate short trainings on organic mixed farming, the uses of manure and compost, as well as on crop production. They worked on this for about two years. They were focusing on domestic consumption, with a view to possibly selling excess produce in the future. The NGOs also gave grants in the form of small live animals to, among other reasons, help farmers produce more organic manure for the fields. Introducing farmers to zero grazing showed that manure could be collected efficiently: previously this had been a major difficulty. All of these techniques were eye-openers. The farmers saw organic farming could increase their yields and give them more hope for the future.

Initial progress was very encouraging. The farmers decided to start organic farming on a larger scale. Many farmers found, however, that the land preparation method that they had been instructed to use (“double-digging”) was very hard work. With double-digging, the soil is dug deep, and then dug once again to