Land use and farming systems in Benin

Attanda M. Igue, Anne Floquet and Karl Stahr

INTRODUCTION

Land use systems are the result of the aggregation of intensive cropping patterns. These cropping patterns are the product of the decisions of farmers operating a farming system. Ruthenberg (1980) defines a farming system as “a collection of distinct functional units, such as crops, livestock, processing and marketing activities, which interact because of the joint use of inputs they receive from the environment, which deliver their output to the environment, and which have the common objective of satisfying the farmers’ aims”.

Any farming system may be identified by its predominant functional unit. Hence a yam-based system is a system in which yam production is the predominant rural activity among several other crops, livestock or off-farm production activities. Farming systems can also be characterised by their fertility management. Shifting cultivation, rotational bush fallow system and permanent cultivation are all frequently encountered in the research region.

Factors which determine the degree of intensification are population density and access to markets. According to Binswanger and McIntire (1987), these two major determinants have the same effect on farming systems but Smith and Weber (1994) argue that they lead to different uses of the resource base, cultivation practices and constraints. Within each path of the evolutionary process, a distinction is made between an expansion and an intensification phase. Systems driven by population forces alone increase food production by opening new land in the land expansion phase. When new land is no longer available, the intensification phase follows in which fallow periods are reduced. In general, population-driven systems in the land intensification phase are characterised by a progressive decline in the productivity of both labour and land (Brabant et al. 1996, FAO 1990). In this chapter, the main types of land use and farming systems are described and the dynamics of their intensification are discussed.
Part 3.1: Natural conditions of agricultural production in Benin

LAND USE AND CROPPING SYSTEMS IN BENIN

The prevailing land use in southern Benin is food crop cultivation. The staple crops are maize, yams, cassava, beans and sorghum, rice and vegetable as secondary crops (Figure 2). The cash crops are cotton, groundnuts and cashew (CARDER-Zou 1999).

Figure 2. Food crop cultivation (% area) in Mono (1994) and in Zou Department (1999)
Maize dominates the food cropping pattern in southern Benin, generally it is sown before cotton in the northern part of the study area and it dominates the first rainy season in the southern part. In the peneplains of complex crystalline basement, site conditions are more complex and diverse than in the coastal sedimentary basin in the south. Consequently, the variety of crops grown is distinctly higher. In the south, maize is grown on all types of soils. In northern part of the study area some soils are less suitable. Figure 2 shows that in Zou, the Department which consists of the coastal sedimentary basin (1/4 of area) and peneplains (3/4 of area), the two most common crops are cotton (26%) and maize (20%). But in the Atlantique, Mono, and Ouémé departments where Terre de barre (Acrisol plateaux) occur, less area is suitable for cotton, and maize covers 56% or more (Ernst-Schaeben 1994). The third most common crop in Zou is the cash crop, groundnut, which covers 13% while two staple crops, cassava and beans occur joint fourth and account for 11% each. Others staple crops are yam (8%), sorghum (4%), sesame (2%), pepper (2%), tomato (1%), okra (1%) and rice (1%). Rice and horticulture dominate in the fringes and valley bottoms. According to Prasad and Nolte (1995), rainfed cropping is significantly lower in the bottoms of inland valleys compared to the fringes and uplands. Land use depends largely on topographic position. On crystalline basement areas, 35% of farms in the bottoms of inland valleys are cultivated, compared to 74% on the fringes, and 30% on the uplands. Between 6 and 8% of the land is not used for cultivation (rock outcrops, bodies of water, riverbeds, wastelands, former settlements, roads or footpaths).

Farming systems and therefore land use systems differ according to environmental conditions (Figure 1). Several agroecological zones are currently differentiated: a southern guinea savannah food crop area (Mono, Atlantique, Ouémé, southern Zou), a central soudano-guinean savannah and cotton growing area (northern Zou), a southern sudanian food and cash crop area (southern Borgou), a northern sudanian cotton area (Borgou North) and a mountain sudanian area (Atakora).

There is a great deal of diversity within each zone due to differences in settlement patterns and access to markets as well as ecological conditions. Ecological conditions are more complex and diverse in the peneplains on the crystalline basement complex (Mountains, Hills, Plateaus, Footslopes, High peneplain and Low peneplain) than on the coastal sedimentary basin (Coastal belt, Lagoon valleys, Terre de barre, Plateaus, Lama depression, Cretaceous) (Igué et al. 1999; Stahr et al. 1999).

**Cropping and farming systems in the South of Benin**

The coastal sedimentary basin, which overlaps with the guinea savannah zone, covers only 10% of Benin but contains 60% of the population. Population density is very high (589 per km² in Bohicon, 469 per km² Abomey and 250-300 per km² in Aplahoue (INSAE 1994). People settled mainly on the plateaux of terre de barre while the depressions and valleys remain less populated.

At the beginning of the century, yields of maize on terres de barre were more than 2000 kg ha⁻¹. As long as population pressure remained low, the cropping phase was short compared to the fallow period. Three or four years’ cultivation followed by ten years fallow or more, for example, allowed for the accumulation of easily degradable organic matter to regenerate soil fertility (Gaiser 1993). Low input agriculture did not significantly change soil quality.
As the population density increased, land use patterns at village level changed: At the same time there was an expansion in the area cultivated. The last strips of forest were cleared around the villages or between the farmlands of neighbouring families. Figure 3 (Koudokpon et al. 1994) depicts typical changes on the Adja plateau. The spatial dynamics of such a southern cropping system are similar to that of intensive systems found elsewhere in the region (for Eastern Nigeria, cf. Lagemann 1977).

Originally, each village (zone I) had once been surrounded by an intact circular zone of original vegetation (zone II) (figure 3a). Apart from religious functions and its use as source of herbal medicines, the zone served as a defensive barrier and, where still present, helped to prevent damage from free roaming small ruminants. Surrounding the forest zone, were rings of oil palms and tree crops and further out, a mosaic of bush fallow and cultivated fields.

Nowadays, the forest strips have been cleared and put under cultivation. Many fields are intercropped by food crops and young oil palms, interspersed by dense monocultures of oil palms in all stage of development (large zone III). In this system, the oil palm trees act as a productive, planted fallow. Very few remote fields are used for cotton and maize cultivation in a bush fallow system (zone IV). Here, crops are cultivated in a relay system, beginning with maize. These are typical forms of intensification. At the same time the fields formerly used for maize are intercropped with palms (zone III). Broadly speaking there is a trend for women and older men to keep the fields close to the village, while the younger men use better but more distant fields. When the whole village territory is under cultivation, farmers establish their cotton and maize fields outside of the plateau area in the surrounding savanna, the valley bottoms or the depression. If these opportunities are no longer available, people start to migrate seasonally or permanently towards the cotton growing regions.

Figure 3. A schematic representation of land use on the coastal sedimentary basin: according Koudokpon et al. (1994)

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1 The following descriptions of management practices are based on the works of Agbo (1999), Azontonde (1993), Koudokpon et al. (1994), Floquet and Mongbo, (1998), Doppler et al. (1999), Leihner et al. (1999).
The next step is the development of compound farming which can be found on the oldest settlements of the Abomey plateau (Wartena 1995; Floquet and Mongbo 1998). Former zone III type fields near the village, mostly cultivated by older people and women, are the most degraded ones. Therefore, new forms of land use are developed close to the village such as small, enclosed home gardens (IIb), pigsties, small plantations of closely planted neem trees (IIc), fruit trees, etc. The well-manured home gardens provide a wide variety of vegetables, maize and other crops. They are often the last plots where maize can be grown while the soil gets more and more exhausted. In former zone IV fields, cowpea and groundnut intercropped with sorghum can be cultivated while on former zone III fields, the encroachment of Striga sp. forces farmers into groundnut monoculture.

While more intensive land use patterns evolve, the soils get more and more exhausted and cropping systems also have to evolve. While the average first season maize yields decrease over 5 years from 760 kg on less degraded terres de barre (for example Hayakpa in Tori-Bossito on the Allada Plateau) to 530 kg in Hévié (Abomey-Calavi) and 280 kg in Adingnigon (on the Abomey plateau), the maize-based main cropping system is turned into a maize-cassava, then a groundnut-maize and finally a groundnut system (Floquet and Mongbo 1998). Mineral fertilizers are virtually unavailable and seldom used outside of cotton growing areas (7% of cultivated areas in Toviklin on the Adja plateau, 5% in Allada, 6% in Covè on the Abomey plateau) (Biaou 1995). But these are not the only changes. Farming activities become a secondary source of income for farmers. On average, farming provides only 40,3% of income for men in Hévié, (a periurban area) and 40,8% in Adingnigon. By contrast it provides 57,6% in Hayakpa and 80% in the cotton growing area.

**Cropping systems in the central part of Benin**

As mentioned in § 3.1.2, settlement began rather late in these areas but soils are now rapidly being taken into cultivation. In the north, (crystalline basement) the population was 187,068 in 1979 and reached 275,653 in 1992 (INSAE 1988, 1994), an increase of 47%. This increase was also partly caused by immigration of people from the southern plateau regions where average population density is high, from the Atacora region where population is concentrated on little arable land and from the Lama depression following the decision of the Office National du Bois (ONAB) to occupy a large part of the Lama for teak production (Igué 1990).

Population growth brings major changes in the environment and current patterns of resource use such as field clearings, deforestation for firewood and charcoal, bush fires and sometimes overgrazing are having disastrous effects on the environment. The natural savannah vegetation has gradually degraded and the ground is now covered by deep-rooting grasses, including Imperata cylindrica, a noxious weed. Satellite images for two periods (1978 and 1997) in the area between 7° and 8° latitude (Igué and Sporer 1999) show the changes in land use and cover in the region. An analysis of the data indicates decreases in woodland and woodland savanna and tree savanna. At the same time there is a high incidence of cultivation on the savanna and an expansion of the mosaic of cultivation and fallow (Table 1).

A study of land use between 1986 and 1996 in two districts, Dassa-Zoumé, a densely populated area that has been settled for a long time and Savalou, a newer settlement area, shows how cropland increased by 51% within 10 years in Dassa, which
is reaching saturation, and by 302% in Savalou during 7 years (CARDER-ZOU 1996). In both cases, increase in cultivated area is linked to an expansion cotton (and cowpea as its complementary crop) and to yam based clearings (Table 2).

Table 1. Land use and land cover 1978 - 1997

<table>
<thead>
<tr>
<th>Land use class</th>
<th>Total area in ha</th>
<th>1978</th>
<th>1997</th>
<th>1997 –1978</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-deciduous and deciduous forest</td>
<td></td>
<td>16.345</td>
<td>0</td>
<td>-16.345</td>
</tr>
<tr>
<td>Dense forest</td>
<td></td>
<td>0</td>
<td>4.171</td>
<td>+4.171</td>
</tr>
<tr>
<td>Woodland and woodland savanna</td>
<td></td>
<td>103.102</td>
<td>96.585</td>
<td>-6.517</td>
</tr>
<tr>
<td>Tree and schrub savanna</td>
<td></td>
<td>452.724</td>
<td>375.027</td>
<td>-77.697</td>
</tr>
<tr>
<td>Tree and schrub savanna with high incidence of cultivation</td>
<td></td>
<td>497.429</td>
<td>296.762</td>
<td>-200.667</td>
</tr>
<tr>
<td>Gallery forest</td>
<td></td>
<td>26.721</td>
<td>27.866</td>
<td>+1.145</td>
</tr>
<tr>
<td>Saxiciculous tree and schrub savanna</td>
<td></td>
<td>3.969</td>
<td>6.995</td>
<td>+3.026</td>
</tr>
<tr>
<td>Mosaic of cultivation and bush fallow</td>
<td></td>
<td>129.400</td>
<td>418.472</td>
<td>+289.072</td>
</tr>
</tbody>
</table>

Table 2. Changes in cropping area (ha) in Dassa and Savalou

<table>
<thead>
<tr>
<th>Crops</th>
<th>Dassa</th>
<th>Savalou</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>7630</td>
<td>7808</td>
<td>1295</td>
<td>9462</td>
</tr>
<tr>
<td>Sorghum</td>
<td>650</td>
<td>1126</td>
<td>1993</td>
<td>3492</td>
</tr>
<tr>
<td>Rice</td>
<td>77</td>
<td>480</td>
<td>10</td>
<td>217</td>
</tr>
<tr>
<td>Yams</td>
<td>2925</td>
<td>1963</td>
<td>0</td>
<td>6570</td>
</tr>
<tr>
<td>Cassava</td>
<td>2450</td>
<td>2993</td>
<td>1237</td>
<td>2963</td>
</tr>
<tr>
<td>Cowpea</td>
<td>3217</td>
<td>4184</td>
<td>2553</td>
<td>6169</td>
</tr>
<tr>
<td>Cotton</td>
<td>4000</td>
<td>17634</td>
<td>3703</td>
<td>12435</td>
</tr>
<tr>
<td>Groundnut</td>
<td>5300</td>
<td>3560</td>
<td>1630</td>
<td>2657</td>
</tr>
</tbody>
</table>

Source: CARDER statistics

The yam-based cropping system in the Zou department increases the number of new clearings because, according to the main yam growers (those from “Djidja” in the South as well as the Betamaribe from the Atakora), yam can only be cultivated on upland soils after forest clearing. Table 1 shows clearly how the yam clearing front is moving northwards (while the crop is losing its importance in Dassa, it occupies more than 6000 ha in Savalou). Yam growers probably clear about 60 000 ha a year. This system has caused for example the destruction of the Boukou forest (20.500 ha) in the Ouémé.
valley which shows that even protected forest areas are being taken under cultivation by migrants (Tchégnon et Biaou 1995).

More and more of the fuelwood and charcoal used in urban centres comes from this area (Mama 1998; cf. SFB 308 Atlas) and an intensive deforestation front is moving northwards.

As already mentioned, if some yam growers are shifting, others develop static and diversified rotational bush fallow cropping systems based on cotton or groundnut and maize. Migrants coming from areas that are already intensively used also take over cleared land from yam growers and settle down. Cotton is linked to the use of fertilisers and the expansion of cotton overlaps with the expansion in the use of mineral fertilizers. Twelve and 15% respectively of the cultivated area is fertilized in the elder settlements of Djidja and Dassa, but only 3 and 4% in newly colonised areas of Savè and Tchaourou (Biaou 1995). This is still less than in the cotton growing area in northern Borgou (26% in Nikki, 27% in Banikoara) and is not sufficient to maintain a balance even though it may slow down the exhaustion of the soil slightly. The rapid expansion process is therefore already turning into phase of visible, if weak intensification.

There is still room for expansion into the lowlands, where nutrient accumulation would allow for intensive land use. Rainfed cropping is significantly lower at the bottom of inland valleys compared to the fringes and uplands (Prasad and Nolte 1995). On the basement complex, 35% of the farms at the bottom of inland valleys are cultivated, compared to 74% on the fringes, and 30% on the uplands. Between 6 and 8% of the land is not used for cultivation (rock outcrops, bodies of water, riverbeds, wastelands, former settlements, roads and footpaths). Rice cultivation is gaining in importance and should become more important still.

Since the dry period of 1963 to 1973, Fulani people have been migrating from Niger, Mali, Burkina-Faso, and Nigeria (Josserand et Sidibe 1992). In Dassa-Zoumé district for example, bovine livestock increased from 743 in 1986 to 7700 in 1996. The number of cattle in Zou department has increased by 67% from 1970 to 1990 (Josserand and Sidibe 1992). Some livestock keepers are settling down and compete with farmers for land. Some of the very large herds in transhumance southwards are a source of violent conflicts with autochthonous populations. Finally, Fulani pastoralism contributes to the degradation of the environment by overgrazing and promoting late bush fires over large areas of natural savannah and bush regrowth. These fires also enter the cashew and other tree crop plantations and destroy cover crops like *Mucuna utilis* and planted fallows. At the same time, pastoralism could create conditions for a better integration of agriculture and livestock and for related fertility management practices. It could also contribute to the promotion of animal traction which is already widely adopted in Borgou.

**Farming systems in northern Benin**

Farming systems in the eastern part (northern Borgou) are either based on cotton or on livestock. Land for cultivation is not a limiting factor yet, but farm size tends to increase while 80% of the farms use animal traction. In Banikoara for example, a cotton producing area, more than 40% of arable land was already taken under cultivation in 1992 and the trend was still continuing. At the same time, competition with livestock for grazing land is increasing with 800 000 heads on transhumance during the dry season in the department and because cotton growers put their savings into animals that are then
kept by Fulani herders. Around Banikoara, livestock density was already over the carrying capacity in the dry season (de Haan et al. 1997). Also, livestock tends to concentrate in protected forests.

Farming systems in the western part, on the contrary, are limited by the availability of land (50% of farms smaller than 1,25 ha). Fifty five percent of the farmed area is under cotton and farmers keep large herds of livestock.

FARMERS’ STRATEGIES

While farm land and labour productivity have been decreasing during the course of intensification, farmers have seized several market opportunities. These include the sale of cash crops for export, of food crops and firewood for the rapidly increasing urban consumer markets and contributing to the labour markets in urban and rural areas. But there still are some untapped possibilities. Strategies developed in two typical villages, one in the sedimentary basin that still has some agricultural potential, and another in the southern part of the basement complex, are discussed below.

Strategies in rural and periurban Southern areas

In Hayakpa, a village located 60 km from Cotonou, the last forests were cut down after the second world war. Average farm size is about 3,2 ha. Bush fallow rotational systems still exist. This village is typical of the region in the South which still has some agricultural potential. Average yearly male income (including the value of food crops for consumption) was about 240,000 FCFA in 1995. Standards of living are rather low (average daily expenditure for soup, soap and light is 18 FCFA per capita) but the food situation is not too bad compared to other areas. Cassava plays an important role in ensuring an adequate supply of food energy.

Within the last few decades, farmers have had to cope with large decreases in the availability of land and soil productivity as well as with the decline of former major cash crops (oil palms, coffee). Different strategies were then developed. Palms, teak and fruit trees have been playing a major part in the local economy and still do. While they are growing, they become an asset that can then be mobilized in time of crisis or at the end of their life cycle. Yet, most of the farmers cannot rely on plantations for making a living anymore. They have to grow seasonal crops for the market as well as for family consumption.

Many farmers introduced new cropping patterns in order to intensify their land use. Cassava development was the main form of intensification in this village. It is the basis of an important processing sector for both men and women. Other villages planted vegetables on ridges as an option, especially tomatoes and chillies, as well as groundnut for fresh consumption or sweet potatoes also on ridges. Unfortunately, even if farmers simultaneously abandon slash and burn techniques and learn how to manage crop residues, these changes in cropping systems involve a higher rate of extraction of nutrients from the soil and are not particularly sustainable. But even so, they do bring a higher return to land and labour.

Most young men do not see any chance of building a future on farms that have to be shared among a large number of brothers and try to leave. But few succeed. Most cannot even complete their training as apprentices and after months or years of small, insecure jobs in the cities, they come back to the village. Those who complete their training are not much better off. Cities are overcrowded with tailors, drivers, tyre
repairers etc. As soon as they marry and have children, they cannot afford to feed their family in the towns and come back. Back in the village the young men crop their fields if they have any but mainly they try to make a living by hiring themselves for work such as, cultivating, gathering firewood from clearings, tapping palms, or transporting products to the roads or markets.

Most of the fields cropped by women are small (average female farm size is about 0.66 ha) but they play a major role in the accumulation of start-up capital for petty trade and processing activities. There is little if any investment in training for girls. If they move to the cities as young girls, they perform domestic tasks for food and shelter and the experience is in most cases negative. Later on, they do not look for working opportunities outside of the village. Many of them are engaged in marketing activities. Women are keen to take advantage of the new opportunities offered by the urban markets but they have little ability to accumulate capital and start income raising activities. Also, women cannot own their own land, cannot plant trees and do not really have any incentive to invest in long term soil fertility. The average yearly income of women, including production for their own consumption, was 71,000 FCFA in 1995, and their average capital was 22,000 FCFA. The vulnerability of women facing crisis is extremely high.

Although the strategies of older farmers’ can be seen as quite successful, the outcome of the strategies of younger men and women are much more unpredictable. The lack of adoption of locally based strategies by young men on the one hand and unsustainable cropping systems on the other leads to impoverishment of both people and soils. In the end, farmers sell their land to urban investors and poverty becomes irreversible.

Maize, yam and increasingly, cassava are now produced for urban markets in cotton areas in the central and northern parts of the country. There, cotton and maize cropping evolved simultaneously because farmers had access to credit for inputs, extended their cultivated areas and hired seasonal labour from poorer regions (Brüntrup 1997). Farmers in the South could not compete and could not even produce real surpluses as they lacked access to credit and technologies that might compensate for decreases in farm sizes and yields. Yet, the expansion of urban consumption markets should be an opportunity for periurban rural areas, which will have to supply them with vegetables, fruits, herbs, fish, poultry, green maize and fresh groundnuts among others. Firewood could also be a profitable cash crop and replace products formerly gathered in fallows. Fallows in the South are already depleted and wood gathering is already practised in the central region where charcoal is now produced on a large scale. Projections predict that the supply of natural fallow in the South will fall to zero by 2005 and that overuse will increase in the central region where vegetation is even more susceptible to degradation than in the South (MEHU 1993).

**Strategies in the central savannah belt**

Farmers in the central savannah are in the process of building long term settlements. Shifting cultivation is coming to an end and farmers are already developing sedentary systems. In order to take advantage of the increasing demand for yam, maize and other food crops as well as for cotton, new migrants have developed quite large farms (about 6 to 12 ha) and made tremendous efforts to obtain wealth and develop their villages, infrastructures and local or regional institutions. The village of Kassehlo, about 60 km
from Bohicon, is an example of how such development has been made at the expense of natural resources. Here all the trees on the village savannah land have been turned into charcoal, especially after the dry period from 1973 to 1983, and some of the soils which had been cleared for such demanding crops as yam and Kerstingellia subterranea are now barely suitable for groundnut.

Nowadays, land tenure is a major issue in the development of sustainable systems because secure long term rights are a prerequisite for farmers to invest in tree plantations, soil fertility management and the development of lowlands plots. Migrants of the second generation often cannot do these things. They have to borrow or rent their land and their farm size is much smaller (6 ha for non owners against 12 ha for landowners). Most landowners use mineral fertilisers (only 24% of fields are not fertilised). Access to fertilisers is the main reason for the cultivation cotton in this area even though it does not perform very well. Older farmers plant oil palms, teak, and, increasingly, cashew trees to provide an income in their old age. Such efforts at farm level should be supported by access to a wider range of technologies, not just those related to cotton.

These days, the main causes of land degradation are no longer directly related to farming practices but to off-farm and livestock activities such as charcoal processing, bush fires related to hunting and cattle grazing but these aspects have hardly been taken into consideration.

**INTENSIFICATION OF AGRICULTURE: PRESENT AND PERSPECTIVES FOR THE FUTURE**

Intensification has been almost entirely in the southern food crop area. Farmers have developed mixed cropping with palms, cropping systems that involve less and less demanding crops, soil cultivation practices which entail gathering the little organic matter left around crop roots (ridging) and they have put more and more effort into preserving and recycling hoed weeds, waste products and refuse. These practices, often inspired by the farming practices of neighbouring intensive regions, permit the development of fairly intensive land use systems but they can no longer be used in the oldest settlement areas. The low productivity of the system reinforces the lack of cash and the consequent inability of farmers to finance inputs and adopt technologies to alleviate constraints. Farmers are receptive to technologies that protect soils against degradation and control pests (weeds, diseases, or insects), provided they do not require large amounts of purchased inputs (Manyong et al. 1995). They were willing to adopt innovations to get rid of Imperata cylindrica. Planting “fallows” based on fast growing multipurpose species, producing firewood, restoring soil fertility and spreading a thick mulch to protect crops against dry spells are all feasible and profitable alternatives, especially if combined with fertilisers and the use of improved varieties. Although such technologies are being successfully developed, they have not been made accessible to many farmers especially those who do not use fertilisers or plant fallow on a sufficient scale.

In the savannah, intensification came with the promotion of cotton as a cash crop and the subsequent use of inputs on credit, as well as of animal traction in the northern areas. Cotton-based rotations have a better nutrient balance than those in the food crop area. However, recurrent bush fires, charcoal processing, overgrazing and the clearance of marginal land for cultivation are still major causes of large scale erosion and soil
degradation. Such issues have not been tackled thoroughly enough by research and extension services and neither have the issues of land tenure and land security. There are some interesting pilot experiments going on, for example within the natural resources management project (PGTRN) but reversing actual trends in land use patterns would require much more integrated efforts from everyone working in research and extension in agriculture, forestry and livestock keeping. Unfortunately, this is not happening and land degradation is spreading much faster than the technological and institutional innovations.

REFERENCES


Igué, O. J., 1990. Migrations de populations dans le Zou. PPEZ -UNB Cotonou


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