

The challenge of participatory natural resource management with mobile herders at the scale of a Sub-Saharan African protected area

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Abstract In Sub-Saharan Africa, the management of rangelands used by mobile populations, such as transhumant herders, must include large scale, sometimes cross-border, components. This mobility, common and significant in transhumant livestock production systems is, in most cases, not taken into account in conservation and natural resources management strategies around protected areas. Most conservation projects which include a development goal are designed to provide support to sedentary subsistence agricultural populations. Securing “pastoral lands” is seldom included as part of protected areas land management approaches. This paper focuses on the difficulty of integrating pastoral, agricultural and conservation issues into a regional land management plan. Based on a case study in Chad (Zakouma National Park), we pay particular attention to local mechanisms of land tenure negotiation, the mobile actors and the complex political landscape that this creates.

Keywords Land tenure · Mobility · Protected areas · Sub-Saharan Africa · Transhumant herders · Wildlife conservation

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Abbreviations

CBNRM	Community Based Natural Resources Management Programmes
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement (French Agricultural Research Centre for International Development)
CURESS	Conservation et utilisation rationnelle des écosystèmes Soudano-Sahéliens (Conservation and rational use of Sudano-Saharan ecosystems)
ECOPAS	Ecosystèmes protégés d'Afrique sahélienne (Protected Ecosystems in Sahalan Africa)
EU	European Union
FAO/LEAD	Food and Agriculture Organisation/Livestock, Environment and Development
FCFA	Franc de la coopération financière d'Afrique centrale (African financial cooperation franc)
GDP	Gross Domestic Product
GEPAC	Gouvernance Environnementale et gestion Participative en Afrique Centrale (Contribution to the Improvement of environmental governance and participatory management processes in Central Africa)
HDI	Human Development Index
ICDP	Integrated Conservation Development Programmes
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNESCO-MAB	Man and Biosphere Programme
NRM	Natural Resource Management
PA(s)	Protected Area(s)
RFBS	Réserve de Faune du Salamat (Salamat Wildlife Reserve)
SSA	Sub-Saharan Africa
ULB	Université Libre de Bruxelles
UNDP	United Nations Development Programme
ZNP	Zakouma National Park

Introduction

In the framework of sustainable development as a guideline for environment protection (UN Conference for Environment and Development 1992; Convention for Biological Diversity; The five IUCN Park world congresses from 1962 to 2003; UNESCO's Man and the Biosphere Programme 1974; World Conservation Strategy WWF/UICN/PNUE 1980; World Commission for Protected Areas 1992) most natural resource management programmes aim to integrate conservation and development issues, involving local stakeholders in the management of protected areas. As a result, most biodiversity conservation projects nowadays contain a social dimension including the involvement and participation of local populations in natural resource management as an essential component (Hulme and Murphree 2001; Adams et al. 2004). Over the past 15 years, participatory approaches to natural resource management and Integrated Conservation Development Programmes (ICDPs) have been markedly supported by funding agencies and biodiversity conservation programmes (Wells et al. 1992; Robbins et al. 2006).

In the Sub-Saharan Africa context, there are many problems linked to the implementation of such conservation approaches. In most of the cases, the ICDP approaches which are brandished on the official documents are very difficult to implement in the field (McShane and Wells 2004; Beinart and McGregor 2003; Blanc-Pamard and Fauroux 2004; Duffy 2000; Hulme and Murphree 2001; Moseley and Ikubolajeh Logan 2004; Rodgers 2005). Indeed, implementation of such conservation programmes often fail to integrate local stakeholders and local natural resources management rules, resulting in the worsening of local poverty (Igoe and Brockington 2007; Adams et al. 2004; Brosius 2006). This is a real issue in the context of Sub-Saharan Africa where people are highly dependent on natural resources for their subsistence.

Nevertheless, protected areas (PAs) of Sub-Saharan Africa are vital tools for biodiversity conservation on a national and international scale. In the context of wildlife conservation in Africa, conservation objectives mostly comprise PA buffer zones and peripheries (cf. the Johannesburg World Congress in 2002) which often have radiuses of up to several hundreds of kilometres. These PA peripheries and buffer zones are managed according to environmental land management programmes, involving land use restrictions for residents. In Sub-Saharan Africa, PA periphery land management plans are generally set up following ICDPs principles and are facing the implementation problems characteristic of ICDPs.

In this paper, we propose to highlight typical failures that can occur in the frame of an integrated conservation programme's implementation, namely the neglect of local land tenure rules and the low integration of key local stakeholders. We will discuss on the basis of the Zakouma National Park (ZNP) case study in Chad, analysing the land management process that has been carried out since 2005. We propose to highlight how the negligence of agro-pastoral land-use issues and transhumant herders' low integration in the land management process are threatening the sustainability of the conservation programme, jeopardising the relationships between conservation stakeholders and local populations.

We will first describe the ecological and socioeconomic context of ZNP as well as land management issues in the park and its periphery. Transhumant stakeholders' strategies and agro-pastoral land use dynamics based on mobility are then described, in order to highlight the difficulty of integrating in an ICDP all local livelihood activities such as agriculture, pastoral livestock production, hunting and gathering.

Then, we will discuss how integrated conservation and development programmes fail to assimilate local negotiation processes for land access, regarding the importance of land tenure challenges at the edge of Sub-Saharan African protected areas. Next, a comparison with the management of pastoral areas around the "W" Transfrontier Park will broaden our perspective. We finally suggest recommendations for integrating mobility-based strategies in land management processes in the context of PAs management.

Materials and methods

Results presented here are based on a synthesis of field and desk studies, carried out under the framework of the GEPAC (Gouvernance Environnementale et gestion Participative en Afrique Centrale—Contribution to the Improvement of environmental governance and participatory management processes in Central Africa) research project. This project, funded by the European Commission, was a collaborative effort between ULB's Cultural Anthropology Centre and Botanical Ecology Laboratory (Belgium), CIRAD (France), Farcha Veterinary Laboratory (LRVZ Ndjamena, Chad) and the CURESS EU programme Conservation and Rational Use of Sudano-Sahelian Ecosystems (Chad).

Fig. 1 **a** Participatory map realised in the framework of the GEPAC project (Hanon 2008). **b** Remote sensing map (land use and vegetation units) realised in the framework of the GEPAC project (after Cornelis et al. 2005)

Original data for this paper were collected around the ZNP (Chad) through participatory mapping, remote sensing and interviews (in sedentary villages and transhumant herders camps) through field missions conducted between 2000 and 2005 and desk studies between 2005 and 2008.

The participatory mapping (Fig. 1a) and interviews have provided data in order to characterised ZNP' population (permanent and seasonal), their land access strategies and land use dynamics (Binot et al. *in press*; Hanon 2008; Hanon et al. 2008; GEPAC 2004, 2007, 2008; Binot et al. 2007; Binot 2000, 2005; Binot and Touré 2004; Hanon 2004).

The remote sensing mapping phase (Fig. 1b) of the study (Cornelis et al. 2005; GEPAC 2005, 2006) has provided the natural vegetation types' distribution at the scale ZNP's area (through a 30 km radius park's border area).

This type of information (vegetation, land use and land access strategies) was missing for the area.

ZNP's location

In south-east Chad (Fig. 2), the ZNP (3,000 km²) is included in the continental dry tropical climate area called Sudano-Sahelian Area (Aubréville 1949).

The Park is characterised by two main vegetation types: *Combretaceae* forests (*Acacia sieberiana*, *A. polyacantha*, *Anogeissus leiocarpa*, *Combretum nigricans*, *C. glutinosum*, *Terminalia* spp.) and *Mimosaceae* wooded savannas (*Acacia seyal*, *A. nilotica*, *Balanites aegyptiaca*, *Anogeissus leiocarpus*, *Ziziphus Mauritania*, *Combretum glutinosum*). It is a sanctuary for Central and Western African biodiversity thanks to water availability throughout the year. Seasonal floods are characteristic of the vast grasslands inside the park and at its periphery. More than 65 mammal and 370 bird species have been identified (Fay et al. 2006; Poilecot et al. 2007). During the wet season (June to November), some big mammals (mainly elephants, giraffes and sable antelope) move outside the park (Fig. 3). The park's peripheries which have low demographic pressure, except at the eastern edge, constitute major "reception" zones for wildlife during the wet season.

Considered as the last biodiversity conservatory in Central Africa's dry lands, the ZNP has been supported by a European conservation programme since the 1980s. Since 2001, the CURESS (Conservation and rational use of Sudano-Sahelian ecosystems) EU programme is supporting land management processes at the scale of the PA and its periphery.

Socioeconomic context

Chad is one of the poorest countries in the world (ranked 167 out of 177 with a Human Development Index of 0.39 (PAM 2007). The national economy is mainly based on agriculture and livestock farming (40% of gross domestic product and 30% of the national export trade) and natural resources exploitation. More than 50% of the land is used as rangeland.

The last census of 1993 estimates the Chadian population at 892.560 persons. In 2001, Barraud et al. (2001) estimated the transhumant herder's population in eastern Chad to number about 300.000 persons.



Fig. 2 Zakouma National Park in South East Chad

Livestock production in Chad mainly includes agro-pastoral and transhumant pastoral strategies based on mobility, with more than 75% of the herds being transhumant (Abdoulmali 2005). As reported by FAO (2001), pastoralism is mainly characterised by the degree of movement, from highly nomadic through transhumant to agropastoral. Pastoralists are by their nature flexible and opportunistic. Pastoralism in Chad (as well as in other Sub-Saharan African areas) concerns mainly cattle, camels, sheep and goats and is currently reducing because of advancing agriculture (FAO 2001). Transhumant herders in Chad move from the North to the South of the country following rains, along pastoral roads called “*mourhal*” in Arabic.

ZNP's land use and land management

Seasonal floods in the area induce high potential for agriculture and pastoral uses, as well as wildlife conservation (Hanon 2008; Poilecot et al. 2007; Binot 2005; Binot et al. 2007; Barraud et al. 2001).

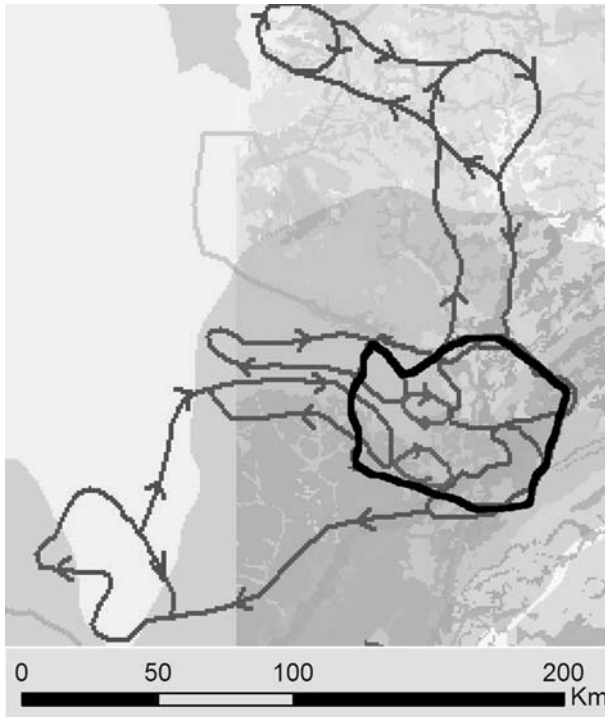




Fig. 3 Wildlife raining season's movements (after Dolmia 2004).  Elephants raining season movements; , ZNP's limits

Zakouma's agro-pastoral land use

The transhumant herders who stay around ZNP during the dry season, are Arabic people originated from northern Chad (mainly from Batha and Ouaddai regions, more than 300 km to the north).

Transhumant pastoralists which move to ZNP's area during the dry season have in most of the cases permanent homestead in the Ouaddai and Batha regions (nearby Abeche or Oum Hadjer), where the older members of the community remain throughout the year and where they have rainy season crop production.

After the dramatic droughts of the 1970s and 1980s, a lot of these transhumant herders have settled in the Guera and Salamat region, nearby to ZNP. There, they became agro-pastoralists, clearing *Acacia seyal* savannas for post-flood sorghum cultivation on one hand and keeping cattle which are entrusted through patronage relationship to their transhumant family members on the other hand.

As an example, inside the same herder's family native from the Batha, we can find transhumant herders (spending the rainy season in Oum Hadjer for example) and moving from October to June around ZNP's area, as well as agro-pastoralists which cultivate sorghum fields in the ZNP's periphery and invest the crops' revenues buying cattle that will be entrusted to transhumant family members.

In the protected area's periphery, there are 91 permanent villages (Fig. 4) (ex-transhumant herders and native cultivators) and transhumant herders settlements dispatched in the main grazing areas (Fig. 4).

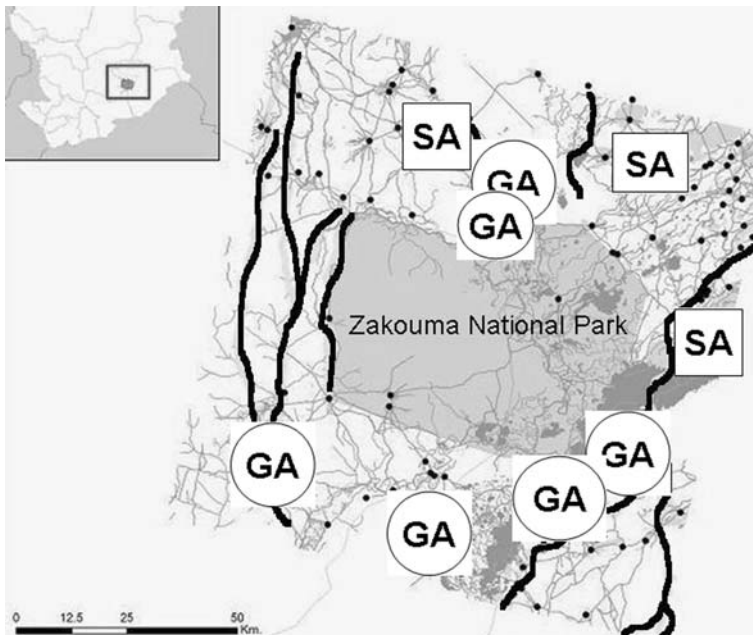


Fig. 4 Zakouma National Park's pastoral roads, raining season's grazing areas and main sorghum areas (after Hanon 2008; Agreco 2007; Cornelis et al. 2005). ●, Village; **█**, pastoral road; **—**, rivers; (GA), grazing area; (SA), sorghum area

Transhumant herders' flows are mainly Arabic people with cattle, camels and sheep. Transhumant herds move during 6–8 months (from November to July) through pastoral roads (Fig. 4). Some herds are just in transit around the protected area, on their way to Iro Lake (South Chad). Others stay during all the dry season on the pastoral areas on the edge of the park. Most of these groups have been moving to Zakouma during the dry season for about 30 years (Binot 2005; Binot et al. 2007). However, the transhumant livestock that transits through Zakouma is mainly part of an international (56%) and regional (30%) trade (Binot 2005), there are many socioeconomic exchanges (barter and trade) between sedentary and transhumant people at the local level. During the dry season, most herders staying around Zakouma have strong kinship affiliations and/or social relationships with sedentary people (for cattle patronage, sorghum residues grazing contracts, sorghum transportation and trading sorghum flour, etc.). These relationships are set up between ex-transhumant and transhumant herders in the frame of kinship relations and social networking, or in the frame of "cash negotiation contracts" between sedentary cultivators and transhumant herders (Binot et al. 2007).

Most of the sedentary population around ZNP comprises Arabic, Boua and Guera ethnic groups. Despite significant changes of human demography due to the settlement of transhumant herders, population density around ZNP remains low, from four to ten inhabitants per km² (Barraud et al. 2001). However, because of the good agricultural potential of the northern and eastern edges of the park, population figures increase rapidly: settlement of ex-transhumant herders in the periphery of the park started in the 1980s and has been increasing since then.

Presently, at the Northern and Eastern edges of the park's periphery, most of the population is now composed of Arabic agro-pastoralists villages (mainly ex-transhumant Myssérié and Salamat agro-pastoralists) (Binot 2000, 2005; Binot et al. 2007; Hanon 2008) and Arabic transhumant herders settlements (mainly Myssérié, Oualed Rachid or Mahamids Arabs; Barraud et al. 2001) during the dry season.

The Southern edge is mainly composed of Guera sedentary cultivators' villages, nearby transhumant herders' settlements during the dry season.

The western edge is nearly empty (in terms of villages and herders settlements) due to the lack of water resources and poor soils.

As elsewhere in Africa, local communities (sedentary and transhumant) are strongly dependent on natural resources for their subsistence. The main socioeconomic activities around ZNP are agriculture, agro-pastoralist and transhumant livestock production (at the rainy season) and gathering of non-timber wild products (by agro-pastoralists and transhumant herders). The Salamat region, which includes Zakouma, is one of Chad's most important areas in terms of agricultural production, especially for post-flood sorghum (*Sorghum durra* or « berbéré », the daily staple of Chadian people) cultivated as both food and cash crop (Raimond 1999; Hanon 2004). As said above, transhumant herders also work with sedentary people during harvest periods for sorghum transportation. They also negotiate grazing rights for their cattle to feed on crop (sorghum) residues (Binot 2005; Binot et al. 2007). Most sorghum fields are located in the alluvial plains located at the Eastern and Northern edges of the Park (Fig. 4). According to Cornelis et al. (2005), the agricultural area around Zakouma represents <6% of the park's border zone. The natural savannas are still being well represented, although fields are undoubtedly expanding. Post-flood sorghum crops is mainly handled by ex-transhumant herders (agro-pastoralists settled at the park's periphery) at the North and east park's edges, and by sedentary cultivators at the south's edge.

Due to the economic importance of post-flood sorghum crops, *Acacia seyal* wooded savannas clearing rights are carefully managed by local authorities (Binot et al. 2007). Hanon (2008) has demonstrated it at the scale of an ex-transhumant herders' village of the eastern parks' edge, highlighting the land tenure reserves marking strategy at short, medium and long term inside village's wooded land (Fig. 5).

This map shows how an ex-transhumant herders' village group had, in 2004, already marked most of the village's *Acacia seyal* woods, in prevision of the future settlement of transhumant herders' family members in the area. This map shows particularly how apparently "empty" natural vegetation can be socially attributed and tactically managed even if this marking is not obvious at the first sight.

Grasslands and wetlands are exploited by transhumant herders, agro-pastoralists, and sedentary cultivators (including fishermen). The main pastoral areas are located in the large grassland plains and natural savannas at the North, South and Eastern edges of the park (Fig. 4). *Acacia seyal* wooded savannas are used for Arabic gum gathering, livestock settlement, and cleared by slash and burn practices to grow sorghum (Hanon 2004; Binot 2000). Arabic gum's trade generates significant additional income for transhumant herders. Other gathering activities concern also wild fruits (*Balanites aegyptiaca*, *Acacia nilotica*) and grasses (*Andropogon gayanus*). These savannas are valued by numerous stakeholders for multiple uses (sometimes with a mix of activities over different time frames).

The pastoral strategy in the park's nearby grazing areas (Fig. 4) is based on frequent moves, according to accessibility and availability of good quality fodder and water resources (Binot 2005). The key factor determining access to rangelands is the pastoralists'

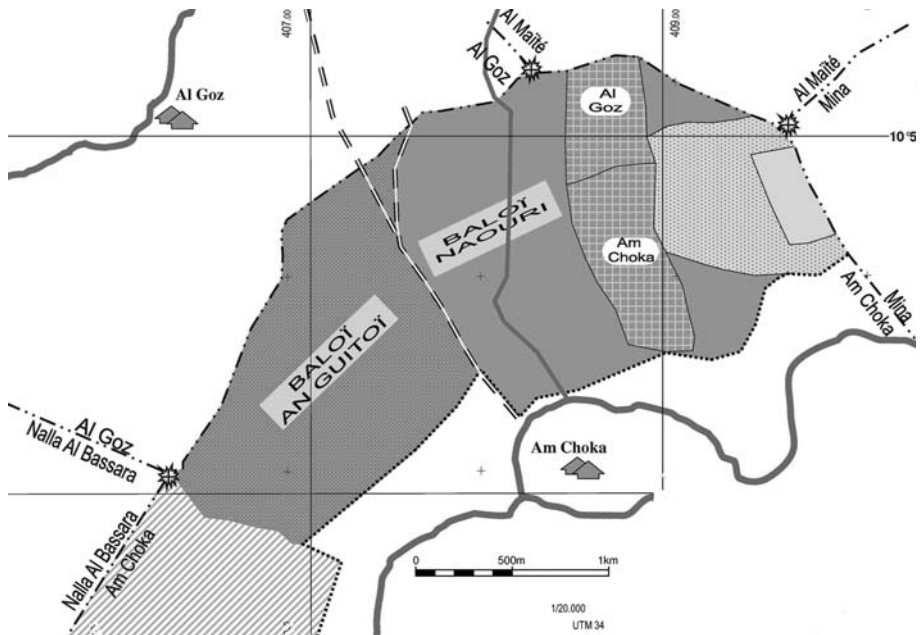


Fig. 5 Village land' marking strategy (Hanon 2008). ■■■■■■■■, Acacia seyal savanna woods area; - - - - - , village land limits; ✱, slashed trees (land tenure marking limits); ▨, sorghum fields; ■, long term tenure reserve; ■, short term tenure reserve; ▩, attributed plots; ▨, natural woods (out of land tenure reserve); 🏠, village names; —, roads

ability to negotiate, at the local level, with sedentary people (ex-transhumant herders and native cultivators) and local government officials. Arbitration by local authorities plays a major role in the land management issues that are linked to land use sharing between transhumant and sedentary people (cultivators or ex-transhumant herders).

In the frame of advancing sorghum fields agriculture, the overlaps between crop fields, transhumant grazing routes generate frequent conflicts (Binot 2005). Most of the time, these conflicts are settled by local authorities in the frame of customary law.

Therefore, during the dry season, land use and economical production at the edge of ZNP result from a continuous negotiation process involving transhumant herders and sedentary people (mainly agro-pastoralists ex-transhumant herders at the northern and eastern park's edges, native cultivators at the southern edge) and even if land tenure and land use conflicts emerge, most of the living strategies are based, as we saw in this section, on local negotiation processes, collaborative work and land use sharing involving ex-transhumant and transhumant herders, and in a slightest part native cultivators.

Zakouma's management context

In the framework of the CURESS Project, a management plan was designed for operational management actions in the park and its periphery. This management plan has identified agricultural area expansion for post-flood sorghum as the major threat for wildlife

conservation. One key objective of the management plan is to control the expansion of sorghum fields in order to protect the *Acacia seyal* savannas from slash and burn practices.

For conservationists, two specific objectives explain management dynamics (Agreco 2006, 2007).

- First, the role of the park's management is not limited to the protected area sensu stricto but extends to a 30 km wide transition zone which is called periphery 1 and to a further area called periphery 2 (Fig. 6). Peripheries 1 and 2 are included in the national Bahr Salamat wildlife reserve (Réserve de faune du Bahr Salamat, RFBS).
- Second, seasonal wildlife migrations have to be taken into account. Several studies (Dolmia 2004; Fay et al. 2006; Poilecot et al. 2007) have shown that during the rainy season, south-western and northern natural savannas at the park periphery are highly frequented by elephants and big antelopes. In order to protect the animals (especially elephants) when they are outside the park, recommendations have been made in the park's management plan for setting up two biological corridors at the north and south-west Park's limits (Fig. 6).

Although the terms of reference of the CURESS project state that development and conservation issues must be integrated, these recommendations confirm that the present management plan has mainly wildlife conservation objectives and doesn't present local integrated conservation and management objective as a prior issue.

As presented in the land management plan, the project should implement a local development plan at the scale of the villages of peripheries 1 and 2. This development plan

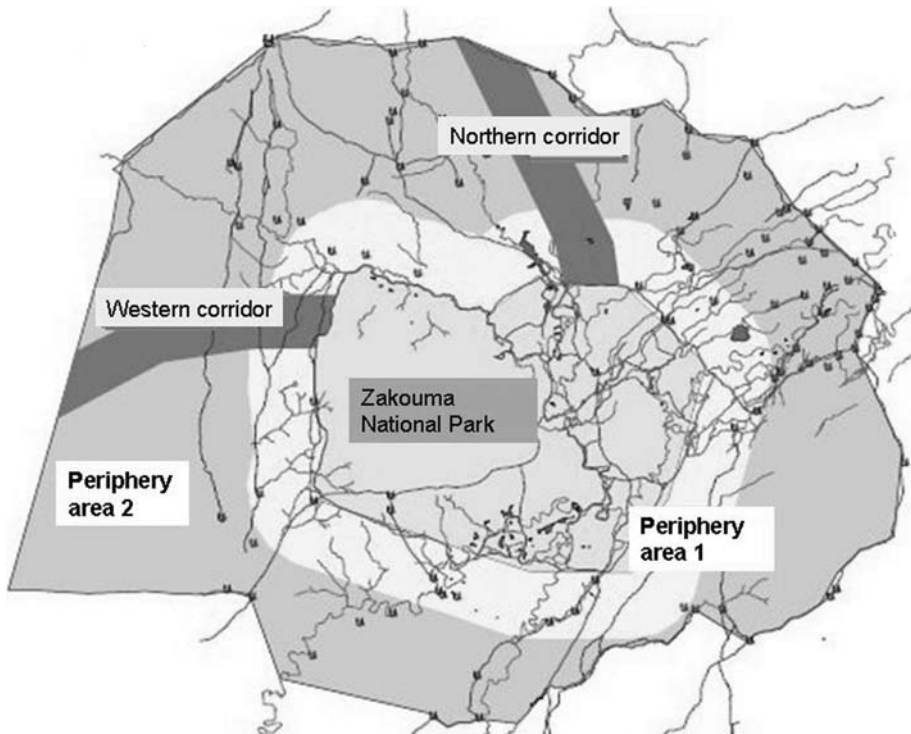


Fig. 6 CURESS land management plan proposition (after Agreco 2007)

should also be coordinated through a new platform comprising local people's representatives: the "RFBS coordination unit", the park's manager, several Environment Ministry delegates, two representatives of the local administrative unit (canton), two transhumant herders representatives, two sedentary people representatives and one representative from civil society's organisations.

Our analysis of the composition of RFBS coordination unit reveals that its members are not representative of the social and political diversity of the area.

Sedentary people

The Zakouma's area is governed by seven different cantonal headmen, each with specific political stakes and often conflicting relationships. These people represent different parts of the park's periphery, where production systems and livelihoods have to deal with varied factors (pastoral settlements, soil problems, water problems, effect of migrations, distance to markets, absence of roads, etc.). The RFBS coordination unit involves only 2 of the 7 cantonal authorities for the land management negotiation process, although biological corridors lead to major land use restrictions. Strong land tenure conflicts between cantons or between cantons and the coordination unit can be expected due to these biological corridors. This threat is major in the north of the RFBS where there is already a territorial conflict between two canton heads, precisely in the area where the northern corridor is supposed to be set up (Edderaï 2007). The biological corridors implementation without real prior negotiation process will lead to land tenure conflicts, mainly because the northern part of the RFBS is a major sorghum area and the main pastoral zone.

The fact that only two "sedentary people representatives" and "one representative from civil society's organisations" are included in the RFBS coordination unit is another socio-political problem since canton headmen are the key sedentary local authorities for land use and access to natural resources. This overlap between the coordination unit and existing political structures, lead to confusion among local people and is a threat to the existing balance of political power.

Mobile people

Transhumant herders are represented by only 2 persons in the RFBS coordination unit, too low a figure to represent the diversity of strategies of pastoral groups concerned by the park's edges.

It has also to be highlighted that mobility is not taken into account in the zoning proposition. There is no possibility of seasonal use rights inside natural savannas and the future biological corridors, and no prior negotiation process has been planned involving pastoral actors.

The focus of the management plan on agricultural—as opposed to pastoral—dynamics indicates that the issue of pastoral use in natural savannas around the park has been overlooked.

As we saw, transhumant herders are key stakeholders in land use dynamics and, due to their mobility, essential partners for the setting up of biological corridors, but they have not been integrated into the negotiation process of the conservation project, which focuses (even with lack of social relevance) on sedentary people.

The social acceptability of these ecological corridors should be discussed, integrating the modifications generated in the frame of sedentary/mobile stakeholders' micro-local negotiation processes.

Discussion

Integrating mobility based strategies in land management

Peripheries of protected areas in Sub-Saharan Africa are the site of various kinds of migrations of animals and people. These are both seasonal cattle movements and annual migrations of animals may cover much longer cycles which need to be re-situated within a given historical, political and demographic context (e.g. agricultural frontiers, mining). To illustrate this, see for example Boutillier and Schmitz (1987) for the flood subsidence system in the Senegal River valley; Alexandre and Binet (1958) on mobility in forest environments in the West Congo Basin; or Condominas (1980) on the notion of social space and time. These movements are overlaid and intersected in time, and take place at scales ranging from the local to the international. Within a gradient of mobility, different examples range from enclosed farming systems (no mobility) to specialised systems (mobility inside hunting and gathering territory or slash and burn), extensive livestock production (mobility over extensive rangelands) and even agro-silvo-pastoral systems (mobility over vast areas through shifting cultivation and/or extensive livestock husbandry for example). Such communities, be they Pygmies, Boschiman, Peul, Kota and the like, are organised in “moveable systems” and their natural resource use strategy is based on their movements (See in particular Bahuchet 1992 for the Aka and Mbuti Pygmies; Lee 1979 for the Kung San; Clanet 1994; Stenning 1959; Bonte 1981 and Dupire 1996 on pastoral mobility).

However, most conservation and development projects are designed to take care of sedentary populations. Public policies regularly encourage sedentary ways of life, mobility being considered as an obstacle in controlling people. The “multi-scale” nature of pastoral use systems (varied production, marketing and, above all, negotiation areas) makes them not easy to be controlled (logistical difficulties and poor understanding of the whole set of decision making processes). Consequently, the institutionalisation of “pastoral land” has not been imposed as part of land management projects on the edge of protected areas, with one or two rare exceptions.

Land tenure challenges at the edge of protected areas

At the root of any land tenure dispute there often lies an accumulation of issues and problems, among which land issues tend to top the list, especially in relation to pastoral land areas or land access restriction for conservation purposes (Toutain et al. 2003; LEAD FAO/CIRAD 2005). It is actually very rare that a pastoral area is delimited and that its use for livestock-rearing purposes is officially recognised by the authorities (Clanet 1994; Dupire 1996). This is even more the case when land use is seasonal, and when land users are not permanently present. Suitable pastoral land management tools (comparable to the registration of farmlands) and laws are lacking, especially in countries such as Chad where extensive livestock farming carries at least as much weight as agriculture-crop farming in the national economy (Barraud et al. 2001). What are usually involved are rules and regulations governing access, based on traditions and customs and on ancestral entitlements. Such rules rapidly show their limits in the event of strong conflicts. The management of pastoral lands at the edge of protected areas present difficulties because most of the time, they are shared in a multi-functional and adaptive approach, between transhumant herders and sedentary people without legal recognition (Binot and Joiris 2007).

The “W” Transfrontier Park pastoral land management experience

Transhumant herders' integration into PAs' land management has been experimented in the regional conservation ECOPAS-W Park Programme in West Africa. We present here the main elements of this experience, in order to feed the reflexion initiated around Zakouma's management programme.

The inclusion of transhumant herders in the management of a protected area and its periphery is conditioned, on the one hand, by a healthy, lasting and sustainable state of land sharing between sedentary and temporary inhabitants and on the other hand, given the attraction exercised on herders by water and grazing resources, by the guarantee that the periphery can satisfy the fodder requirements of livestock, without herders having to venture illegally into the conservation areas (Convers et al. 2007; Toutain et al. 2003).

The management of pastoral resources in a conservation context needs to be addressed under specific terms of reference. Negotiations must be held to take into account the strategy and claims of transhumant herders. Negotiating parties must include herdsmen, large land owners, protected areas agencies, local elites and government representatives. The regional conservation ECOPAS-W Park Programme in West Africa provides an example where such a negotiating process took place, tending to improve land access for herders nearby the protected areas and its peripheries (Convers et al. 2007).

This process was initiated in 2000 by the managers of the regional park when it was established through scientific studies that most of the core protected area was occupied by illegal transhumant cattle during the annual dry season (roughly from November to May). This strategy was chosen by the transhumant herders in order to avoid conflicts with local farmers, mainly cotton producers (Toé and Dulieu 2007). This situation was especially important in the Benin sector (a huge area with few roads and a high level of poaching). In terms of conservation, the inexorable decline of elephants and other flag species mammals (Lamarque 2004), characteristic of the fauna in the West African sub-humid climate savannas, brought the parks' managers (the ECOPAS Programme, funded by European Union from 2001 to 2008) and concerned governments (Benin, Niger and Burkina Faso) into a discussion and negotiation process (Alhadji Boni, in Lamarque 2004) in order to design an action plan.

One of the very first priorities of the action plan was to have a clear view of the situation of transhumant cattle movements including the big issue of the transborder movements towards Benin: every year, a lot of conflicts were occurring, when herds from North (Burkina Faso and Niger) entered the Park illicitly, and crossed borders (Convers et al. 2007). At that time, the official Benin administration reaction was to declare the penetration of foreign herds on national territory unlawfully.

As a result of the analysis of this tense situation led by the ECOPAS Programme (Toutain et al. 2003), it was decided to start a negotiation process including all stakeholders and appropriate authorities (local administrations, traditional chieftains, rural organisations, etc.) in each of the three countries concerned. In February 2004, a regional meeting, organised under the umbrella of the regional West African political organisation WAMU (UEMOA) and with the support of the ECOPAS-W Park Programme, validated a set of measures including a rehabilitation of the old traditional transborder livestock routes, the creation of new transborder routes, and at the same time, identification of dedicated dry season pasture areas, including the buffer zones of the Benin W Park and various protected areas.

The main interest of this agreement was that it was based on an actual participatory negotiation. On the one hand, with the transhumant cattle having left the Regional Park core area, a visible impact was the increase of wild mammals' populations. On the other

hand, this agreement had a crucial positive impact on herder's livelihoods. It is obvious that the legitimacy of the ECOPAS Regional Programme, founded on high level political will, as well as the status of UNESCO-MAB Biosphere Transfrontier Reserve of the protected area (UNESCO 1996)—allowing the possibility of specific human uses of buffer zones—played an important role: i.e. environmentally friendly activities such as monitored dry season grazing and the direct implication of the three heads of states, through their administration, had both a crucial impact on the elaboration and the achievement of this negotiation process. However, the fact remains that a clear understanding of the context and present interactions was a prerequisite to action. Besides, the whole process was carried out with a real dialogue with local communities, including an efficient circulation of information and an appropriate use of media. These last points were probably keys to success.

In the ZNP land management case, the existing legislation and land management proposition fail currently to integrate such a multi-sector approach (e.g. integrating agricultural, pastoral and environmental issues) based on participatory negotiation process.

Negotiation processes for land access

In Central Africa, customary and traditional area of land, corresponding more exactly to areas of land used and/or farmed by a given community (Mendras 1976; Karsenty and Marie 1998), have the characteristics of having blurred and changing boundaries, as opposed to the geometric areas planned as part of management and development plans, with fixed and clearly defined boundaries (Fig. 6). Such customary areas are the object of a system of appropriation that is being constantly negotiated at the micro-local level, between the members of a community or the members of bordering communities, within the same economies (between sedentary cultivators or agro-pastoralists, for example), or between communities practicing quite distinct economic systems (for example between sedentary cultivators and transhumant herders) (Binot and Joiris 2007; Barrière and Barrière 1997).

In the specific case of protected area management, a zoning process (e.g. land management plan) involves, on the part of local populations, a modification of their relationship to the environment: new representations of nature; new strategies of land use and livestock production; new methods of access to resources; new forms of control over this access, and new ways of distributing and sharing out the resources available within the group and between the groups.

These zoning arrangements involve significant operations of local socio-economic and political changes. The sphere of influence of traditional authority in terms of rules and regulations for the use of natural resources and for land management (as in central Chad, where the sultanates have complete control and command over land issues) cannot be ignored. From the viewpoint of local users, zoning and land management give rise to a series of socio-economic and ecological changes within land-use dynamics: changes in agriculture, hunting and gathering areas, type of resources available, etc. These changes induce modifications inside social organisation between users, especially in the negotiation of rules for land access.

It is important to bear in mind that these changes are generally little known by the manager of a protected area, because the zoning is designed without taking into account the existence of local social dynamics of land use.

In the case of land areas shared—on a seasonal basis—between transhumant herders and sedentary people, as in ZNP's context, these issues need special attention in order to

maintain the multi-functionality of land, including pastoral and agricultural uses balance, vouching socio-economic balance.

Involving herders within a dialogue and negotiation approach, means for the PA's manager to acknowledge the dynamic aspect of relations between parties in a multi-functional approach for managing grazing lands and cultivated areas. The challenge of protected area's management in the agro-pastoral context lies in the capacity of coming up with a flexible management and consultation plan, suitable for integrating the dynamics which hallmark zones bordering protected areas.

Conclusion

Despite the various difficulties, most conservation projects involving protected areas land management in Sub-Saharan Africa contribute to the learning process of integrated conservation and development programmes' implementation. The main difficulty lies in the management of land tenure issues and rules of access at the interface of conservation and production areas.

The mobility that hallmarks pastoral production systems in Africa is not sufficiently taken into account in protected areas management plans. Mobility involves assessing territorial management on different time scales (seasonal periods) and different spatial scales (including people who may not be present in a given area at the time of negotiation).

The zoning of protected area's buffer zones, in the frame of land management plans, has strong impact on local land tenure issues linked to pastoral use and/or farming strategies. First, it induces sociological repositioning that implies deep socio-political modifications. Then, it has strong impacts on local stakeholders' relationships. These repositioning and their consequences (negotiation processes, respect for new zoning, etc.) require time to be truly assimilated by local parties concerned.

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