

## Human Migration in the Protected Zones of Central Africa: The Case of the Dzanga-Sangha Special Reserve

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### ABSTRACT

This paper is a summary work-in-progress of a series of case studies conducted around the Dzanga-Ndoki National Park and the Dzanga-Sangha Special Dense Forest Reserve concerning the impact of human migration on natural resources in and around protected areas. The authors present an analytical model of the dynamics that drive both in- and out-migration in the Sangha-Mbaéré region, concluding that in-migration is a severe but underestimated threat to the future of protected areas in Central African forests. The most severe migration threat to protected areas emanates from the diamond economy, a force having much greater impact on the forest environment than commercial timber extraction. In the second half of the paper, the authors present an account of the ecological and social impacts of diamond mining occurring in and around the Dzanga-Sangha Special Dense Forest Reserve.

### GENERAL INTRODUCTION

In recent years, human migration has posed increasing threats to the biodiversity of forest zones in central Africa. Studies have examined the effects of immigrant communities around protected areas, demonstrating that numerous factors compel rural and urban populations to leave their homes and settle in protected zones. Often immigrants are fleeing poverty and moving to areas where there are jobs, fertile land, and forests that supply an abundance of plant and animal resources. This influx remains one of the most complex obstacles to conservation in central Africa. The U.S. World Wildlife Fund and its partners have conducted a series of case studies in the Central African Republic to determine the causes and the impact of these migrations in the Sangha-Mbaéré region, the location of the Dzanga-Sangha Reserve<sup>1</sup>. The results demonstrate that the scale of migration in the protected area is immense, and that ramifications of such immigration extend beyond national or even regional borders. It is urgent that a strategic response to these migrations and impacts be formulated if there is to be long-term management of the natural resources of the Dzanga-Sangha Reserve. In addition to pressures from immigration, the Reserve is controlled by the developing forest economy and the dynamics of the diamond-mining frontier. This article addresses these issues of migration to the Dzanga-Sangha region, taking into account the specific difficulties and opportunities for continued conservation work.

<sup>1</sup> Ndelengué (Aug. 1996); Salo (Jan. 1997); Boumandjoukou (Jan. 1997); Bayanga (Dec. 1996); Bouanda (Apr. 1997).

## RESEARCH METHODOLOGY

The fundamental research approach employed by the team of social scientists that undertook the study was the Active Method of Participative Research (AMPR), a general field technique for social science.<sup>2</sup> AMPR is an intensive process that is easily learned, and is designed to gather knowledge of rural areas efficiently. Essentially, AMPR is based on small, multidisciplinary teams that use a variety of methods, tools, and techniques especially chosen to allow better understanding of rural situations. Our research team collaborated with directors of the Dzanga-Sangha Reserve to formulate the research objectives of the various components of the study. Preparatory missions and protocol arrangements were undertaken to inform inhabitants of the villages identified for sampling of the research project. Researchers responded to particular social, economic, and ecological contexts at the local level, in order to minimize the risk of conflicts and contradictions that might arise among local populations, immigrants, and the research team.

A number of AMPR tools were used to collect the data. The research team stayed in the target villages for seven to ten days, using AMPR techniques, including semi-structured interviews, participative village charts, historical profiles, seasonal calendars, and transect, cadastral and grid charts. In response to interviews and self-analytical discussions, villagers generated visual aids and charts which further facilitated their participation in, and control over, the data collection process. The on-site interviews and analytical syntheses were primarily conducted in Sango, the national language of the Central African Republic (CAR). The final reports, however, were written in French. Before leaving the village, the team presented a compilation of research results to the inhabitants, not only to ensure the transparency of the process, but also to check with the local partners on the reliability of the data. At the conclusion of the field period, the results of these studies were presented to the directors of the Dzanga-Sangha Reserve and to the local population of Bayanga, the town in which the Reserve headquarters are based.

<sup>2</sup> *Proceedings of the 1985 international conference on rapid rural appraisal*. (Khon Kaen, Thailand: Khon Kaen University, 1987); Bara Gueye and Karen Freudenberg, *Introduction à la méthode accélérée de recherche participative (MARP)*, London, International Institute for Environment and Development, second edition, 1991.

## THE SUB-REGIONAL SOCIOECONOMIC AND POLITICAL CONTEXTS

The central African countries that share the forested Congo River basin have established a regional environmental plan, integrating conservation agendas with economic and social development needs of the communities living in and around protected areas. Despite these efforts, serious concerns remain as local communities' economic practices may threaten natural ecosystems, thus undermining conservation efforts.

In addition, tensions and social crises that accompany the processes of political change have been rife in several central African nations (including Rwanda, Burundi, and the Democratic Republic of Congo). The violence of military conflict has forced human communities to take refuge in the forests, where they have been living off the floral and faunal species there. Fundamentally, the political context of central African nations complicates and undermines long-term conservation goals; the combination of corrupt political regimes and politico-ethnic rivalries that challenge the authority of the state complicate efforts to preserve biodiversity.

Many of the states in central Africa are continuously subjected to a number of economic pressures that affect national conservation programs. Faced with increasing unemployment, irregular payment of civil servants, and above all with the payment of foreign debts, many central African states tend to sacrifice conservation in favor of replenishing the public treasury. Economic policies of many African states prioritize the export of raw natural resources as the leading component of gross national product. In CAR, economic production focuses on timber and mineral extraction, as these industries are lucrative enough to enable CAR to repay contracted debts to international states and lenders, with a minimum of national investment in infrastructure.

A clear example of this emphasis on extractive industries can be found in CAR, within the Northern Region Development Project (NRDP), based in Bangui. In spite of its zoning classification, this project saw part of its basic territory handed over to a Canadian diamond and gold company called Howe-Centrafrigue. The arrival of this mining company immediately attracted a wave of unemployed rural and urban youths to the region, leading to a rise in poaching (Mogba 1996).

For today's impoverished communities of central Africa, the forest offers a space for survival and economic security. Immigrants mix with indigenous peoples and engage in both subsistence and commercial practices of natural resource exploitation, and sometimes even in large-scale speculation. Communities are incorporated to various degrees into the complex patterns of transborder trade, commerce, and interethnic relations. The migratory dynamic linked to the exploitation of forest resources is a source of frequent conflict between local and immigrant populations, especially around the borders of Congo, Cameroon, and CAR, where cases of arrest, punishment, and even execution are not infrequent.

These complex socioeconomic, political, and cultural issues need to be addressed in examining possibilities for the long-term conservation of natural resources in central Africa. How can biodiversity

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be protected against excessive exploitation of natural resources in the face of economic development and the fight against poverty? At what level does immigration of human settlers threaten protected areas? Given that the forested area of central Africa will long remain the point of intersection of divergent economic interests of local and foreign agents, is there an opportunity today for local, national, and regional responses to the impact of migration on protected zones?

### THE CONTEXT OF CONSERVATION IN THE SANGHA-MBAÉRÉ REGION

Recent linguistic, archeological, ethnohistorical, and anthropological studies have shown that the Sangha River region, including the forests of southern CAR, has long been an area of migration due to economic, political, and social contact (Giles-Vernick 1996). Prominent economic activities that fundamentally altered social dynamics were commercial forest exploitation, particularly timber, and slavery. Since the 15<sup>th</sup> century, the activities of Portuguese, Dutch, English, and French traders who engaged in the exploitation of the forest changed the ecological and demographic picture in the Sangha-Mbaéré region. Trading networks were established to the northeast with Rabat, and to the northwest with the Portuguese, Dutch, and English. The arrival of concession companies following the decree of 1899 and the construction of the Congo-Ocean railway and other systems of road transport also marked the migration of populations toward the forests of the south. In addition to timber exploitation, human exploitation and exportation was common: a number of communities from the regions near present-day Nola, Carnot, Bania, and Bossangoa were captured by slave traders, and were deported to the Americas via the Sangha-Oubangui axis (Suret-Canale 1962).

Because of the influence of extractive industries as well as trading networks, the Sangha-Mbaéré region is known today for its diverse population. For example, during the colonial era rubber companies undertook requisitions and forced deportations to ensure the collection and transportation of rubber (Giles-Vernick 1996). Still today, the post-colonial economics of forest and diamond exploitation continue to attract immigrants to the forest region.

Bayanga (pop. 3,103 or 0.5 people/km<sup>2</sup>), the town around which both commercial and conservation activities revolve in southwestern CAR, typifies the ethnic, linguistic, and social diversity resulting from centuries of migration and mixing of communities. Apart from the local BaAka and Sangha-Sangha populations, one finds immigrant communities of various ethnic backgrounds. The data collected in our studies of different villages demonstrate that these

immigrant communities outnumber the local population. Not only do immigrants represent more than half of the total population, but they also control the majority of economic activities.

Because of the ever-mounting economic pressure in the region, in 1988 the government of the Central African Republic decided to classify the forest area around Bayanga as a protected zone. In addition to commercially valuable materials, this moist tropical forest shelters considerable biodiversity. The forest houses elephants, bongos, gorillas, and a number of unique plants. To protect these species, the government of the CAR asked the World Wildlife Fund for technical assistance in setting up the Dzanga and Ndoki national parks. Surrounding these core national parks, the Dzanga-Sangha Dense Forest Special Reserve was established. Although human activity is explicitly forbidden in the parks, road-side farming, traditional and safari hunting are permitted in the multiple use zones, with some variation from zone to zone. Even commercial forestry is allowed, as the concessions existed well before the creation of the Reserve. In principle, however, timber companies are required to respect the limits on logging as defined in their contracts. Mining, on the other hand, is forbidden in the Reserve.

*Human migration is a fundamental problem for the survival of the Reserve; its natural resources are constantly under pressure from increasing human settlement.*

## FACTORS THAT CONTRIBUTE TO MIGRATION FROM PLACES OF ORIGIN

Migration in the Sangha-Mbaéré region is linked to numerous factors, including ecological and climatic changes in the sahel, and a number of sociocultural pressures. These diverse pressures have one common feature: they all compel people to leave their places of origin. At the same time, the Sangha-Mbaéré region attracts immigrants because of its rich forests and mineral deposits, which offer a source of employment for many economic migrants. This migratory dynamic threatens the future of the Dzanga-Sangha Reserve.

## CLIMATIC AND ECOLOGICAL CHANGES

In general, one can speak of two categories of immigrants to southern CAR. The first group are “ecological refugees,” people who have immigrated from the sahel regions of Senegal, Mauritania, Mali, and other countries to the north and west of CAR. The migratory patterns that these long-distance immigrants follow once they leave their natal countries are complex. In the course of their travels, many long-distance immigrants cross numerous countries, and work informally at a number of jobs before arriving in CAR. Migrants have held such diverse jobs as travelling merchants, tailors, mechanics, tea or cola salesmen in Gabon, the Congo, or Democratic Congo. The savings they amass while travelling are often invested as start-up capital in diamond mining.

The second category of migrants is the Fulbé/Mbororo herders who come from Cameroon and Chad in search of good grazing to the south. Having settled in Sabéré, on the Nola-Salo axis, these herders use brush fires to beat back the forests that shelter the tse-tse flies, and to promote grazing around their villages of Ndelengue, Monasao, Beya, and Belemboké. Once insignificant, the number of herders has increased considerably because of the demand for animal protein at the many diamond shanties in the area, and because of the opportunity to sell cattle products down the Sangha River in Congo and Gabon, where prices are very alluring.

#### RURAL AND URBAN POVERTY

Difficult economic conditions in both rural and urban areas continue to compel poverty-stricken people of the CAR to migrate. These conditions of poverty stem from an economy dominated by the cultivation of crops that do not sell well and from the difficulty faced by young people in finding paid employment. Once they leave the school system, which itself does not adequately prepare young people for lucrative employment, youths have few options, the most popular of which is immigration to the forestry and mining zones where they hope to make their fortunes. Most of the migrants one meets in Salo, Ndelengue, Bayanga, and Bouanda, towns in the forested region of southern CAR, are former students coming from the various savanna regions of the country (including Bossangoa, Berberati, Sangha-Mbarere, Ombella-Mpoko). Young people often strike out for places where they have a relative or an old friend who is already working in the diamond mines or in a sawmill. Many of the young men are single; some have left young fiancées in the village, hoping to summon them to the forested regions, once material conditions are satisfactory for family life to begin.

#### SOCIOCULTURAL CONSTRAINTS

Sociocultural pressures such as forced labor, witchcraft, and marriage are also causal factors of inter-regional and national migrations. In general, migrants often arrive in Bayanga coming from Nola, Berberati, Bossangoa, Paoua, and Bouar and contact or settle with relatives and friends from their home villages.

Some immigrant populations were deported to the Sangha-Mbaéré region by the colonial administration and concession companies to compensate for the loss of manpower caused by sleeping sickness, which is endemic to the area. Over time, these immigrants have been able to build a new life by adopting some of the local customs of southern CAR; some have been remarkably successful, both economically and politically. Such is the case of the Gbaya who

LOCAL LEVEL	NATIONAL LEVEL	TRINATIONAL LEVEL
<p>ACTORS</p> <ul style="list-style-type: none"> <li>• Economic Actors</li> <li>• Dzanga-Sangha Project</li> <li>• Traditional Authorities</li> <li>• Administrative Authorities</li> </ul> <p>SHORT TERM (1-2 Years)</p> <ul style="list-style-type: none"> <li>• Research and demographic monitoring</li> <li>• Establishment of dialogue between the CDB, the Project, and Economic Actors</li> <li>• Extension work concerning impacts of migration</li> <li>• Re-energizing of local development groups</li> </ul> <p>MEDIUM TERM (5 Years)</p> <ul style="list-style-type: none"> <li>• Research and demographic monitoring</li> <li>• Apply laws concerning forest and diamond exploitation</li> <li>• Increase institutional capacity to better manage natural resources</li> </ul> <p>LONG TERM (10 Years)</p> <ul style="list-style-type: none"> <li>• Continual monitoring of demographic changes</li> <li>• Negotiation of co-management between economic actors and conservationists</li> </ul>	<ul style="list-style-type: none"> <li>• State</li> <li>• Projects</li> <li>• University</li> <li>• Economic Actors</li> </ul> <ul style="list-style-type: none"> <li>• Education about social and ecological impacts of migration on protected areas</li> <li>• Call for the state to develop a population policy for protected areas</li> <li>• Research, seminars and workshops on migration in protected areas</li> </ul> <ul style="list-style-type: none"> <li>• Define the legal scope of migration in protected and integrated areas in PNAE</li> <li>• Prospect and zone diamond sites</li> <li>• Better control of timber companies</li> </ul> <ul style="list-style-type: none"> <li>• Definition of a policy concerning the national exploitation of resources (timber, diamonds)</li> </ul>	<ul style="list-style-type: none"> <li>• Congo</li> <li>• Cameroon</li> <li>• Central African Republic</li> </ul> <ul style="list-style-type: none"> <li>• Research and demographic monitoring</li> <li>• Exchange of experiences concerning the control of migration</li> <li>• Identification of the states in trilateral conservation</li> </ul> <ul style="list-style-type: none"> <li>• Research and demographic monitoring</li> <li>• Eco-regional planning of conservation and development actions</li> <li>• Coordination of national population policies in protected areas</li> </ul> <ul style="list-style-type: none"> <li>• Research and demographic monitoring</li> <li>• Coordination of conservation and development</li> </ul>

Figure 1 Strategic solutions for migration around the Dzanga-Sangha Reserve and neighboring region.

came from Bossangoa and Berberati, and who are now village chiefs (for example in Ndelengue) or shanty chiefs in Salo or Bouanda.

Migration within the Sangha-Mbaéré region is often connected with witchcraft, mostly in the Mpiemu villages of the Kouapili sector of Salo. Witchcraft can be explained by two principal factors: jealousy of individual success, and repayment of human “debts” contracted with other sorcerers. In fact, individual success is negatively viewed in Mpiemo society, where the majority of people live in poverty. Success is viewed in relative terms, as wealth is portrayed through the construction of large tin houses, dwarfing the small wattle-and-daub houses of their neighbors, or through repeated, showy visits to parents who remain in the village. According to both young and old, the consequences of witchcraft are manifold, imped-



ing both economic and social success. Witchcraft causes unnecessary loss of life and the retardation of village development. The instinct for self-preservation often causes Mpiemu to emigrate from their natal villages, and to settle permanently in the areas around Bayanga, where they work in forestry or as tourist guides in the Dzanga-Sangha Reserve.

Marriage-related migration leads young women to follow husbands who work in the diamond shanties or in workers complexes. Upon their arrival, new wives are rapidly integrated into local economic activities, becoming small-time merchants, producers of alcohol, and diamond workers.

### FACTORS THAT ATTRACT MIGRANTS

There are three principal factors which draw migration to the forests of the Sangha-Mbaéré: opportunities in the diamond economy, commercial forestry industry, and administrative and tourist service sector.

### DIAMOND ECONOMY

According to case studies conducted in Ndelengue, Bouanda, and Salo, the diamond economy remains the main attraction in the region. Since the 1930s, the forest area running from Carnot to Nola, including Ndelengue, Bouanda and Salo, has been the object of intensive diamond concession prospecting. Diamond deposits are located in sandstone and sometimes in the hydromorphic areas that cover all of the northern part of the present Dzanga-Sangha Reserve. Diamond prospecting and extraction are underwritten by foreign capital coming from large industrial companies such as DeBeers. By subcontracting with the National Purchase Office and by working through intermediaries, international companies invest in diamond “shanties” that have been established by immigrants throughout the region. The organization of the work and transactions is structured (see Figure 2).

Diamonds are mostly found in stream beds that criss-cross the Sangha-Mbaéré region. Numerous techniques are used to extract the thick layers of gravel that cover the diamonds. To reach the layer containing the “good heart,” the gravel containing the diamonds, workers remove huge quantities of earth, sand, and gravel. The first technique consists of simply digging large holes at least five meters deep to reach the diamond layer. Motorized pumps are often used to pump water out of the holes. In addition, dams are often built in the stream beds to divert the river water, in order to more easily reach the diamonds. Another common technique is to send a diver into a river to remove the gravel (called *nagbata*, or “diamonds”) in



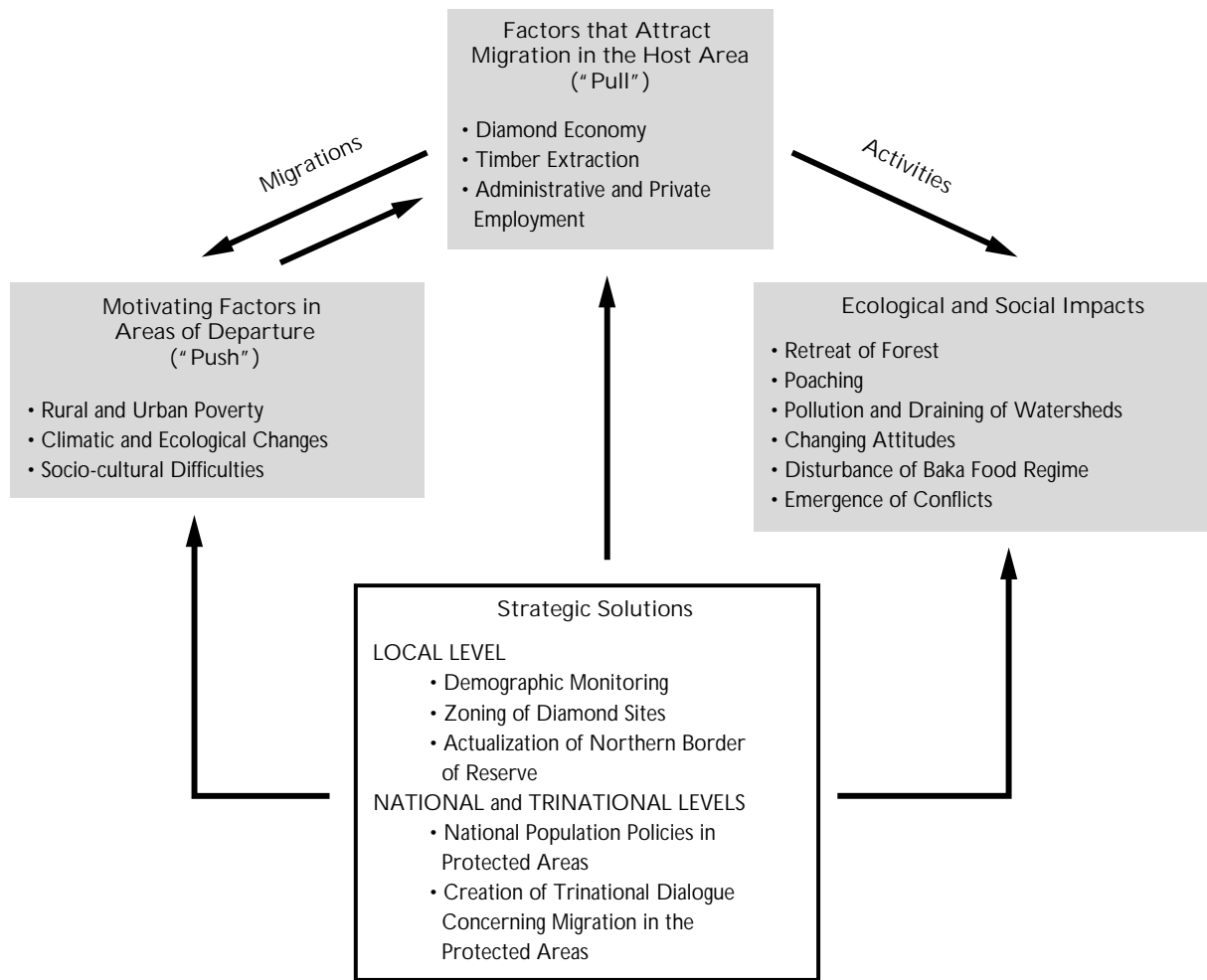


Figure 2 Analytical diagram of migration around and in the Dzanga-Sangha Reserve.

baskets, which are emptied into a pirogue and inspected by other workers.

Diamond extraction poses risks of drowning, injury, and rockslides. Yet despite these risks, the diamond economy attracts people from a variety of socioeconomic backgrounds. It offers more possibilities for unemployed urban and rural youths than agriculture. Employment is always available to poor immigrants at the shanties, and a constant supply of food is assured by the collectors and shanty chiefs. The possibility of financial speculation enables travelling merchants to develop supplemental economic activities, despite a law that prohibits their entry into and residence within mining zones. These merchants supply the camps with food, alcohol, tools, and fuel for the motorized pumps, and extend credit

to the mine workers. Merchants thus control the diamond economy from the mines to the Bangui Purchase Office, where they act as intermediaries. This domination of the industry by merchants and intermediaries is one of the main obstacles to the state's effective control of the diamond economy.

Despite legislation that prohibits all diamond activities from around the Dzanga-Sangha Reserve, the diamond front is today located in the northern part of the Reserve, along the Sengue, Liboue, and Yobe waterways. Shanties of immigrant merchants dot the advancing line of the diamond front, as it moves further into the protected forest. When the productivity of a diamond shanty declines, the shanty chiefs, merchants, and workers abandon the camp to reestablish their operations in a more prosperous area. Many camps that were once prosperous are now inactive and abandoned. One such example is Camp Zaïre, which once was home to 2,000 workers, but is now empty, having been replaced by the Ernest and Bouanda Camps in the forest not far away. Historically and politically, interests in the diamond economy predate and undermine international concerns for natural resource preservation in the Dzanga-Sangha region.

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## FORESTRY

The dense forest of CAR covers an area of approximately 30,000 km<sup>2</sup>, or a little less than 5% of the surface area of the country (617,000 km<sup>2</sup>). It is confined to the southwestern extremity of CAR, below a line extending from Bangui to Berberati, and creates a continuous formation to the south of Mbaiki and Nola, in the Lobaye and upper-Sangha prefectures. The forests in CAR comprise the northern part of the great central African forest that covers southern Cameroon, Gabon, and Congo, and the Democratic Republic of Congo. Historically, industrial exploitation of the forest of CAR began immediately after World War II, when large concessionary companies gained access to 120,000 hectares of land. Four years after independence, in 1964, the exploitation of the forest's natural resources was controlled by nine concessionary companies of different sizes. From the period from 1948 to 1965, timber production increased from 16,000 m<sup>3</sup> to 172,925 m.<sup>3</sup>

With the recent closure of the Sylvicole corporation, a timber company that was based in Bayanga, there is currently only one active forestry company in the region. The Sangha-Mbaéré exploitation company, known by its French acronym SESAM, has been operating out of Salo since 1990. This company holds a permit to exploit 106,000 hectares, which is divided among four units of forest production. This large timber concession extends from the Kouapili sector to

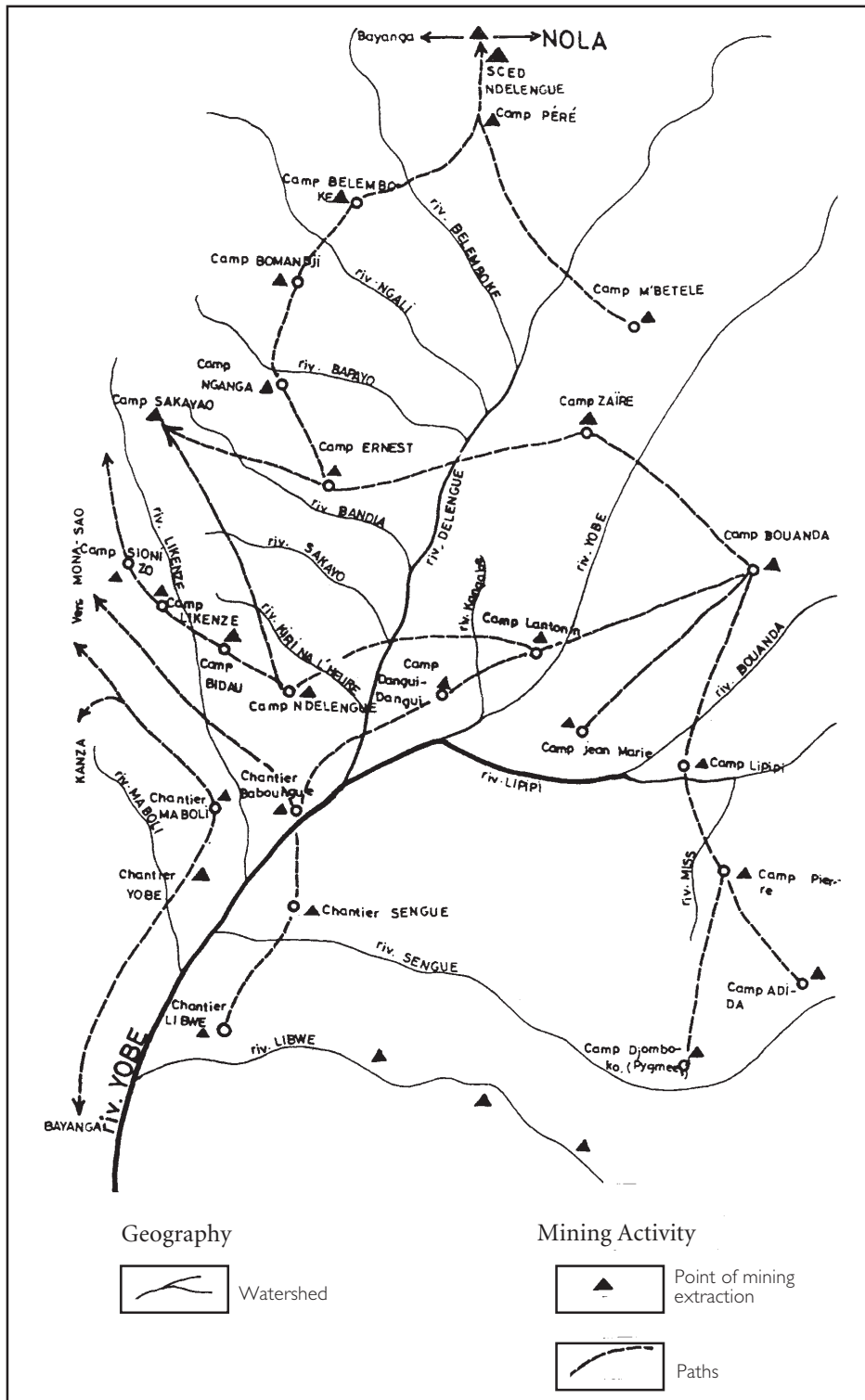


Figure 3 The diamond front in the northern part of the Dzanga-Sangha Dense Forest Reserve.

the Gobomou waterway that divides CAR and Cameroon. In the process of felling trees, SESAM opens roads, paths, and clearings for equipment, leaving empty pockets within the forest. This timber exploitation is never followed by the silvicultural operations necessary for the regeneration of the forest and other natural resources.

Like the diamond shanties, the forestry companies (including Slovenia Wood, which operated from 1971 to 1987, Bayanga Sylvicole, in operation from 1993 to 1997, and SESAM) created an impetus for extensive migrations of men and women in search of employment. When it was operating, Sylvicole employed about 400 workers. SESAM now manages a staff of 280 workers. Formal and informal economic activities tend to emerge around these forestry companies, including hotels and bars, small-scale traders and merchants, and commercial crop farmers. The workers' camps are supplied with game and other forest products by the surrounding villages. With a view to maximizing profits, some of the employees also invest through their wives in the diamond economy, in hunting, in alcohol and raffia wine. All in all, forestry leads to a number of ancillary activities that are incompatible with the goals of conservation. Thus not only do timber companies attract migrants for work as loggers; migrants are also attracted into service industries that serve the swelling population.

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### **JOBS IN ADMINISTRATION AND TOURIST SECTORS**

In addition to being an outlet for extractive industries, Bayanga is a center of administrative employment in government, development and conservation offices, as well as small-scale businesses. The mayor's office, the police, and the constabulary are all located there, and receive civil servants from other parts of the country. Private hotels and small businesses linked to the development of regional tourism and the diamond trade have also sprung up. Recently a large ecotourism center has opened at Doli Lodge, providing a hotel, restaurant, and tours into the Dzanga-Sangha Reserve. These enterprises combine to attract regional, national and foreign migration by workers in search of paid employment.

### **THE IMPACT OF MIGRATION ON THE RESERVE**

As a result of the increasing concentration of human activities, the impacts of migration on natural resources are considerable. These deleterious effects can be broadly grouped into two main categories: ecological and social. Three main ecological problems affect the Dzanga-Sangha region: pollution and desiccation of water sources; retreat of the forest border; and anarchical exploitation of the wildlife. The social problems facing the communities near the

Reserve are caused by three primary factors: changing perspectives; changing diet; and increasing conflicts over access to natural resources between local and immigrant communities.

## ECOLOGICAL IMPACTS

Diamond mining contributes to the disruption of the system of waterways that feeds all of the northern and western parts of the Reserve.

### POLLUTION AND DESICCATION OF WATER SOURCES

A large number of streams that had been overexploited for years have simply dried up. The use of certain techniques, such as the construction of dams, causes a deviation in the course and flow of rivers and streams. In many cases, the piles of extracted gravel are either left on the banks or are dumped back into the streams, obstructing the normal flow of water. While small streams all but disappear during the dry season, during the rainy season the majority of the waterways overflow because of the artificial deviation of their courses. This overflow results in widespread flooding, decomposition of the undergrowth, and even the disappearance of non-aquatic species. In addition to the damage caused to watercourses by damming, water pumps also pollute water sources with oils and chemicals. These practices greatly contribute to the degradation of the quality of the water in areas where the miners work.

Visits to the shanties along the Alindjombo, Kangabe, Belemboke, Yobe, and Lipipi rivers reveal the sorry state of the soils. Everywhere enormous holes have been dug into the stream beds or banks, devastating the overhanging forest that runs along these waterways. The size of these holes depends on the depth at which gravel is being extracted. Unfortunately, these holes are never filled in when the work is done, creating a danger to humans and to large mammals such as elephants, buffalo, and bongo. Analysis of the site visits and 1990 images from the LANDSAT satellite (maps created by the Biodiversity Support Program in 1993) confirm the existence of large-scale clearings along the length of forest streams and rivers.

### DEGRADATION OF THE FOREST HABITAT

Other environmental practices that damage the forest reserve include deforestation and brush fires. Indeed, the corollary activities of workers involved in the diamond economy, including subsistence agriculture, the production of raffia wine, and the production of bamboo roofing tiles, all contribute to large-scale deforestation. In short, where the extractive industries are successful, the forest declines. Deforestation is typical in the towns of Ndelengue, Salo, and

Beya, as well as in the Zaire and Bouanda camps, where multiple human pressures come to bear on plant resources.

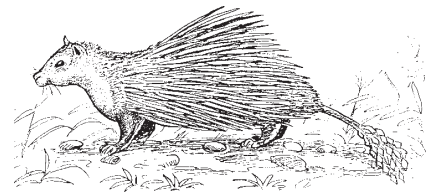
The forest is also subject to enormous pressure from subsistence farming. The use of brush fires to clear fields around villages and campsites for the cultivation of manioc and maize is widespread. The swidden agriculture practiced by all of the local and immigrant populations consumes a great deal of the forest and depletes the land. Principal crops that cover huge tracts of land are manioc, the staple starch of the majority of people, and maize, which is used in the production of alcohol. Farmers do not usually return to fallow land, as the soil is sandy and fertility declines rapidly, preferring to open new clearings in the forest. The current rise in population, especially in Bayanga itself, poses serious problems for the management of agricultural land. The regulations governing the use of land within the special reserve fix the limits of agriculture at 500 meters on either side of the road, but new cases of agriculture more than 600 meters from the road have been observed.

One plant resource that is particularly endangered by human exploitation is raffia, the sap of which is consumed as a wine locally known as “molengue.” It is now exploited by regional and national immigrant communities (Berberati Gbaya, Mpiemu, Dagba, Ngondi, and Mossapula), who have developed a taste for raffia wine. The raffia economy has long been an important source of revenue for residents of Bayanga, and current demand now reaches as far as Salo, Nola, and Ndelengue. Prices are always high due to migratory shifts in the region. Believed to be magical, raffia is a source of numerous ancillary and polarizing economic activities. The depletion of raffia has serious consequences for both human and animal populations. Birds and elephants consume seeds of raffia trees, grubs and caterpillars feed on raffia palm hearts, and humans produce wine from raffia shoots and consume grubs and caterpillars as an important, seasonal food source.

Whether it be the production of wine or of bamboo roofing tiles, the clearing of scorched earth for agriculture, or timber exploitation, it is certain that the widespread and ungoverned exploitation of the forest habitat has consequences not only for the Reserve, but also for the food supplies and revenues of local populations, impacting both humans and animals.

#### EXPLOITATION OF ANIMAL RESOURCES

The rapid immigration to the forested region surrounding the Dzanga-Sangha Reserve results in increased food needs for burgeoning numbers of people, and also in rising expectations of personal profit and income. According to the local populations of Bayanga



*Atherurus africanus*  
(Illustration: Bernardin Nabana)

and the surrounding villages, the anarchic exploitation of once plentiful forest game is a direct result of the rapid influx of forestry companies and their employees, the state administrators, and the development of private tourist industries. These immigrants to the region create a constant demand for meat from the forest, which has resulted in wide-scale poaching of forest animals. In addition to feeding the wealthy immigrants to the forest region, the bushmeat is also sold to mining laborers living in the shanties, and is sold in the markets of Bayanga, Nola, Berberati, and Libongo, across the Sangha River in Cameroon. For many unemployed immigrants, hunting has become a highly profitable economic activity, the proceeds of which are reinvested in diamond working, alcohol production, as well as in hunting materials such as snares and cartridges.

Hunters utilize various forms of hunting technologies, including rifles, snares, and traps. Rifle and snare hunting are especially widespread. A single hunter in Bayanga may have 200 steel snares and three of the locally-manufactured guns known as “yarenga.” In Salo’s Kouapili district, over 60% of the population possesses at least one firearm. These weapons have never been declared to the game wardens, and are thus technically illegal. Another widespread hunting device, although forbidden by the forest regulations of CAR, is the steel snare. This device is particularly damaging to forest mammals as it entraps and kills animals without regard to species, age, sex, or fertility. Setting 200 snares in a plentiful area, one hunter may catch between 40 and 80 different animals in one round of hunting. Hunters are often forced to abandon part of their catch because they cannot transport all of the meat to market before it rots.

Ecological surveys conducted around the reserve reveal that stocks of game are diminishing rapidly within the reserve. It is now necessary to travel more than 40 km into the forest to find even a small monkey or a blue duiker. Poachers commonly infiltrate the Dzanga-Sangha Reserve following the Yobe waterway, where they camp for five or more days within the Reserve before returning to their bases. These illegal incursions are the cause of numerous conflicts between the project’s guards and the people living in the mining camps.

Local communities claim that immigrant hunters believe in the perpetual regeneration of wild animal populations, and thus justify the acceleration of poaching on the reserve. The indulgent exploitation of faunal species does not spare protected species; they are culled for food and commercial needs like any other mammal. Currently the Bouanda camp is a central point for coordinated hunting activities, incorporating hunters and consumers from other, nearby camps (such as camps Zaire, Sakayo, Ndelengue, and Ernest) as well as towns and villages.



## SOCIAL IMPACTS

Social impacts of forest exploitation may be grouped in three categories: changing outlooks on the forest, changing diet, and the development of conflicts over natural resources between local and immigrant groups.

## BEHAVIORAL CHANGES

Immigrant populations often bring with them alternative traditions, beliefs, and practices that can result in changes of perspectives and behavior among local communities. Immigrant groups may bring negative values and perspectives acquired in cities or towns, where competition and individualism have undermined communal responsibility and common heritage. Far from aiding social cohesion and development in the host region, the diffusion of these values fragments the region into sub-groups with divergent interests. This situation is evident in the mining camps, where the absence of a traditional socio-cultural network capable of integrating the various immigrant groups leads to social stratification and conflict.

Where people do not have emotional investment in the traditions of a place, social deviance is common. In Bayanga, deviance is mostly the affair of immigrant youths. Disenchanted after long and fruitless stays in the shanties, young men may give themselves over to alcoholism, drugs, abuse, and violence.

Alcohol remains a serious social problem among both local and immigrant populations. As a result of the widespread alcoholism among young adults, there is a general lack of respect for public authorities and elders; fights, divorces, and murders increase as alcohol consumption increases. In an attempt to avoid conflict, many of the immigrants do not live in the Kouapili villages of Salo, but prefer to live in the shanties away from the collective pressure of an inebriated population. This situation does not favor the integration of the immigrant populations into the preservation strategies of the host areas. These social pathologies are the main causes of conflicts such as assault, rape, adultery, or the theft of tools and diamonds in the camps, that are frequently submitted to village chiefs and local police officers. In addition to these social ills, young girls often engage openly in prostitution, working among employees of mining and timber companies as well as in tourist hotels and restaurants.

Despite the complex social situation in Bayanga, some positive changes have emerged as a result of projects aimed at sustainable development and forest management. The presence of foreign organizations such as the World Wide Fund for Nature has contributed to the development of an environmental ethic that is mitigating some of the haphazard and extreme exploitation of plant and animal

*Abusive and accelerated logging throughout the Sangha-Mbaéré forest has resulted in the rapid decline of some plant and animal species such as mushrooms and caterpillars, which are an integral part of the diets of local communities.*

resources. Coordinated conservation and development efforts have also led to greater integration among communities that surround the Reserve, organizing communities to participate in the management of their natural resources through participatory and decentralized structures such as the Development Committee of Bayanga.

#### DISRUPTION OF BAAKA DIET

As an example of the unanticipated yet fundamental change that impacts local communities as a result of intensive exploitation of forest resources, the research team examined the changes in the BaAka diet. Charts made with the people of Salo, Ndelengue, Bouanda, and Bayanga to plot ecological evolution have revealed a symmetrical relation between the retreat of the forest and the disturbance of important BaAka food sources. Dietary disruption impacts BaAka and Mpiemu communities, as their diets traditionally rely heavily on foods collected through hunting and gathering. The diets of such forest communities depend on seasonal cycles of the forest. Abusive and accelerated logging throughout the Sangha-Mbaéré forest (near the towns of Nola, Salo, Ndelengue, Bayanga) has resulted in the rapid decline of some plant and animal species, such as mushrooms and caterpillars, which are an integral part of the diets of local communities.

Caterpillar gathering is an important part of the seasonal activities of the Mpiemu and of the BaAka communities, occupying men, women, and children. Various kinds of caterpillars, known as “mboyo,” “kanga,” “mboungou,” and “ndossi,” are collected during the rainy season, in July, August, and September of each year. During the caterpillar season, villages and schools empty out as families move into the forest, where people stay for weeks, competing to collect vast quantities of caterpillars. Once gathered, the caterpillars are sun-dried and brought back to the village in baskets. Some are sold, although the majority is kept for family consumption. Rich in protein, the caterpillar has an important place in the diet of forest populations.

Unfortunately, the caterpillar population is declining sharply because of intensive logging targeted at the tree that produces leaves on which caterpillars feed. The host tree, known by its trade name “Sapeli,” is of top export quality and is eagerly sought after by the logging companies. According to the people of Mekanda, the traditional gathering of caterpillars came to a halt for the decade between 1986 to 1996, as caterpillar populations had declined steeply because of intensive logging of Sapeli trees. Although small-scale gathering has begun once again, it is now necessary to cover long distances to find caterpillars in any significant quantity, requiring prolonged habitation in the forest, with the attendant risks and inconveniences.

As with caterpillar gathering, mushroom picking is a highly valuable activity in the southern ranges of the forest. Unfortunately, mushrooms are retreating in the face of pressures on the forest environment. The available quantity is now insufficient for either human consumption or the diets of certain animals, in particular tortoises and duikers.

The combined factors of tree clearance by timber operations and hunting by poachers result in depleted resources for local communities. According to one informant:

There was once a time when game was plentiful, and it was possible to hunt with nets throughout the area. It was easy to catch porcupines (“nguenze”), large monkeys (“bacoya”), and antelopes (“mboloko”), and to supply families with meat. Now there is nothing. Animals have become scarce because of hunting with rifles and the project’s prohibition of hunting in the areas where there is game. Even honey, which is plentiful in the park, is off limits. We are forced to eat leaves like the animals (Ndelengue, April 1997).

Such statements about the shortage of food reveal that the BaAka and other local communities have diminished access to natural resources, despite their residence in the forest region well before immigrant communities in the forest region. BaAka and others suffer acutely from malnutrition and intestinal parasites among children. Efforts to compensate for the food shortage through agricultural production have not met their needs, as the more sedentary lifestyle of farmers has created other complications for the forest communities.

#### CONFLICTS BETWEEN LOCAL AND IMMIGRANT COMMUNITIES

Migration causes communities accustomed to different ways of feeling, thinking, and acting to mix and mingle, causing disagreements and misunderstandings in the shared space. Three main conflicts tend to predominate: hunting access, diamond theft, and the failure of timber companies to observe quotas and regulations. Semi-structured interviews on these subjects conducted across different sociological categories (youths, elders, and women) convey a sense of the relations among the communities of the Sangha-Mbaéré region.

Conflicts over hunting arise from lack of understanding of laws, illegal possession of weapons, and the failure to respect protected species. Many of the local and immigrant populations possess fire-

arms and steel snares, and hunt in direct competition with each other. The numerous attempts of officials of the Ministry of Forests and Waters to control and repress local hunting (in Bouanda, Ndelengue, Salo, and Bayanga) have created a backlash of fear and hostility among people in response to any actions that suggest animal preservation. The difficulties faced by the Dzanga-Sangha project in developing local conservation activities in Salo stem from this negative reflex among communities of locals and immigrants alike, reactions against the strong-arm, institutionalized measures to confiscate guns and imprison offenders of hunting restrictions.

The diamond conflict is purely factional, limited to those parties involved in the diamond trade. "Tic-tac," or diamond theft, supports the local black market, where diamonds are sold below value, and the surplus value is returned to the initiator of the deal.

In discussions with communities concerning the management of natural resources, predominant issues articulated by local people concern the tendency of timber companies (such as Sylvicole and SESAM) to ignore the regulations on timber exploitation, as well as the lack of local participation in determining how the forest is managed overall. Despite the protests of local people, many of the trees that the timber companies fell are abandoned and left to rot in the forest. To further complicate the issue of local communities' rights to intact forest resources, many communities are not aware of the social responsibilities required of companies such as SESAM, as defined in their charters. Local communities were not involved in the negotiations between government and company officials, which resulted in the concession of 106,700 hectares of virgin forest being awarded to SESAM. Similarly, the PAF (forest management plan) pilot project was developed without the participation of the local communities, now the primary victims of SESAM's large-scale deforestation. Yet officials of the Ministry of Forests and Waters have remained silent on these discrepancies. Local people have argued that they would like to see rigorous control of the activities of the forestry company, and to be properly informed of the expectations of companies' behavior and actions. In a complex cycle of poverty and struggles for rights, local people too often are relegated to the position of onlookers as state-endorsed companies pillage the natural resources of the forest on which local communities rely for their survival.

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## RESPONSE STRATEGIES TO THE IMPACTS OF MIGRATION

Control of migration in the Dzanga-Sangha Reserve poses a problem. As long as the economic boom linked to forestry and mining continues, migration will continue. Given this hypothesis, it

is necessary to re-evaluate the stakes of conservation in this region of unstable, heterogeneous populations, where pressures on natural resources are becoming difficult to control because of the divergent interests of the diverse economic agents in the region.

Given the increasing levels of poverty and unemployment and the absence of any clear political option concerning the flow of migration, the state and the Dzanga-Sangha conservation project are in an ambiguous position; unfortunately, conservation may receive an increasingly low priority. Nevertheless, a certain number of participatory strategies have been designed in conjunction with all parties, aiming to sustainably manage the Reserve's natural resources. These strategies are at once local, national, and trinational.

## LOCAL STRATEGIES

### *Tracking Statistics and Demographics Within the Reserve*

The future of the Dzanga-Sangha Reserve requires that concerned individuals, communities, and organizations address the factors which threaten the forest, acting in concert. The principal threat to the forest ecosystem is the dynamic of migration, which is driven by the development of the mining and forestry economy, since these sectors are an economic magnet, drawing local, national, and international economic agents. The diamond frontier that previously centered around Nola has progressed southward rapidly, involving the colonization of new lands and branches of the Yoble River (including Belemboke, Ndelengue, Sengue, Liboue, and Kangabe). This rapid immigration of destructive economic agents is compounded by the weakness of the formal regulations of access to land, and by the lack of coordination of on-site examinations by the Ministry of Forests and Waters to ensure that land and resources are being managed properly. The current political, economic, and juridical context favors the anarchical exploitation of natural resources, with the many associated pressures that come to bear on the forest and human communities.

One of the first strategies for controlling migration and its effects on the forest is to thoroughly research population density, in order to chart the variations in waves of migration within the Reserve and in the villages around it. These demographic studies are currently in an experimental phase, directed by researchers working with the Dzanga-Sangha conservation project. A census covering all of the communities in the region of Salo and Bayanga was undertaken by WWF in 1995. The results of this census, in combination with other studies on forest exploitation, will provide the project with fundamental data of forest use according to categories of sex, age, marital



*Cricetomys* sp. (Illustration: Bernardin Nabana)

status, education, and length of habitation in the region. Above all, this census will allow the conservation project to better plan its work by taking into account fluctuations in migration, and their impacts on the forest ecosystem.

### *Creation of Community-Level Organizations*

One of the difficulties in exercising any control over migration in the area of the reserve is the lack of community organization and participation. Despite the wealth generated by diamond extraction, many local communities do not have clean drinking water, schools, or health clinics. In Bayanga, community associations, such as SEWA (a women's development group in Bayanga) and the Community for the Development of Bayanga, are feeble in comparison to the development problems that the community faces. If local communities are not organized into strong development associations, they will be unable to control access to resources on which they depend for survival. Likewise, without a solid organizational structure, successful land management for long-term agricultural production will be elusive, as immigrant communities will continue to wrest control of land through money, political power, and marriage alliances.

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### *Zoning and Planning*

One of the main obstacles to the control of immigration is immigrants' relatively free access to land. Currently, rules governing access to land are informal, and whenever a newly arrived ethnic group becomes demographically or politically predominant in a given zone, the rules of land access change. In general, the first group to exploit a tract of land for commerce, hunting, or agriculture lays claim to that land. This general system of land tenure characterizes the shanties at Ndelengue and Bouanda, where access to land passes first to prospectors, and then to local communities by leasing on a first come first serve basis. No formal rules exist to govern land control and tenure. Before the arrival of the Dzanga-Sangha conservation project, occupation of arable land was free and uncontrolled by institutional authority. With the creation of the Reserve, agricultural activity along the periphery of the Reserve was limited to within 500 meters of roads; however, because of demographic pressure, these limits on the exploitation of land are no longer respected.

The need to establish a local zoning and planning policy is obvious. Given that access to land is an essential element in the management of natural resources, a primary goal is to regulate land at the local level. These new regulations of land would include all of the

rights that a person, mentally, physically, privately, or publicly, might have to land or to the trees on it (Bruce 1989).

### *Control of Human Migration in the Northern Reserve*

How can the impact of migration on the northern part of the reserve be controlled and minimized? In principle, the law of CAR and the Dzanga-Sangha project's charter forbids any economic activities within the reserve; however, there are scores of miners and immigrants living in shanties within the protected area. What can be done? It is essential for project managers to make the borders of the reserve physically evident, especially in the northern reaches of the protected area, which serve as the main gateway to diamond traders and miners. Control posts should be created to allow reserve guards to patrol regularly. This concretization of the borders and implementation of guards would allow the project to halt the advance of the diamond front, to better control the migration of workers beyond their camps, and to formalize notification of and sanctions against any illegal human incursions into the forest. These efforts will require major financial investments, even during this period of financial constraint, but the survival of the reserve and of the species it harbors depends on such concerted and proactive steps towards actualizing conservation.

*The absence of any sub-regional legal institutions governing forests and wildlife endangers the interests of conservation as well as local communities in the Congo River basin.*

## NATIONAL STRATEGIES

### *Zoning the Diamond exploitation Sites*

The current, unrestrained search for new mining sites by diamond prospectors heralds the continued expansion of the diamond frontier. Miners' prospecting methods depend on empirical research based on natural landmarks and personal experience with the mining industry. Because of the lack of restrictions on their prospecting activities, the miners embrace plentiful opportunities to exploit the and in extensive and destructive ways. Semi-structured interviews conducted with officials of the Ministry of Mines and Energy confirm the urgent need for a solution to the chaotic and unmonitored dynamics of mining, as illustrated by data collected in diamond zones located near Bouanda.

The Ministry of Mines and Energy plans to survey current diamond zones, and to officially designate certain areas in which diamond mining will be officially permitted and regulated. The goal of this survey is to create a mining map of the southwestern region of CAR in order to identify the areas that are potentially rich in mining resources. Following this work, sites could be zoned into Units of Mining Production (UPM), and allocated to miners.



## INSTITUTION OF AN OVERALL CONSERVATION ADMINISTRATION

The lack of coordination between the Ministry of Mines and Energy, on the one hand, and the Ministry of Forests and Waters, on the other, is detrimental to conservation. They have different visions and policies concerning the management of natural resources in the overall context of the problem of development. The policies of the Ministry of Mines and Energy have always encouraged exploitation in order to attract many economic partners to the country. Exploitation permits are handed out without regard to local conditions of specific sites, authorizing the bearer to extract diamonds and other resources with no attention to fragile or protected ecosystems. By contrast, the Ministry of Forests and Waters promotes policies that combine conservation and exploitation, coordinating exploitation and the creation of protected areas through the Forestry Management Plan.

These fundamental contradictions in the policies of the two ministries compound the complications of controlling immigrant populations. The government of CAR should seriously consider the development of a more thorough conservation policy through the creation of an overall administration to govern exploitation and conservation policies in the forest regions.

At the institutional level, existing laws have often been passed without considering the interests and needs of local communities. Laws concerning forests, wildlife, and mining were elaborated and implemented without any coordination among them, and without the consensus of the local people. Without an overall administrative policy that integrates the interests of conservation and those of migrating populations, use of land and resources becomes unstable. It is imperative to consider better local and state management of both the environment and the immigrant communities within the Reserve, through the creation of appropriate institutional mechanisms for coordination among ministries and non-governmental organizations.

*Despite the proclamation of a political will to conserve representative ecosystems, current economic contingencies including poverty, unemployment, and the repayment of foreign loans to the World Bank and the IMF, often compel the state to opt for the economic exploitation of natural resources.*

## TRINATIONAL STRATEGIES: THE CREATION OF SUB-REGIONAL MECHANISMS FOR DIALOGUE

The absence of any sub-regional legal institutions governing forests and wildlife endangers the interests of conservation as well as local communities in the Congo River basin. In CAR, conservation management of fragile ecosystems is fragmented into factions of organizations, with differing perspectives, goals, and activities. There is little dialogue and information-sharing among the different actors, such as government organizations, environmental NGOs, and local communities. Correspondingly, the interests and needs of any particular group are generally ignored by others. Similarly, the expe-

periences of one group do not enrich the others, leading to a serious underestimation of the size and scope of phenomena of environmental degradation in each country.

It is time to rectify a situation that can only benefit poachers, miners, and forestry companies with no environmental ethics. Studies have shown the need for certain regulatory steps to be taken in the short-, middle-, and long-term. Essential components of coordinated work toward sustainable development and conservation include demographic research and follow-up, information sharing and coordination (particularly concerning patterns of human migration), the identification and management of trinational conservation interests, and the coordination of national policies on communities within the protected areas.

## CONCLUSION

The Dzanga-Sangha Reserve is currently threatened by regional, sub-regional, national, and even international human migration. The development of the forestry and diamond economies with concomitant activities such as poaching, swidden agriculture, and trade in munitions remains the principal factor that attracts immigrants to the region. The impacts of immigrants are simultaneously ecological, socioeconomic, and cultural. Institutional and technological obstacles continue to impede better understanding and management of these human movements. Despite the proclamation of political will to conserve representative ecosystems, current economic contingencies, including poverty, unemployment, and the repayment of foreign loans to the World Bank and the IMF, often compel the state to opt for the economic exploitation of natural resources. The dominance of economic interests over political (and ideological) theories is demonstrated through the granting of concessionary permits to forestry and mining companies in forested regions, sometimes even within the protected areas (as was done for Sylvicole in Bayanga, SESAM in Salo, and Howe-Centrafrigue in Sangha, in the Bamingui region). In the absence of laws governing human migration in the protected areas, conservation is jeopardized. Because of social and economic competition among immigrant populations, coupled with a lack of understanding and appreciation for the forest environment, traditional rules concerning the protection of the environment collapse as destructive speculation and exploitation of resources gain momentum.

Overall, the impacts of human migration undermine conservation efforts. If the problem of migration is acute in CAR, it is also manifest in varying degrees in the neighboring countries of Cameroon

and Congo. In the long-term, it is possible that these countries will be similarly affected by the impacts of human migration and the resulting disappearance of resources. The need for trilateral consideration of the issue of migration is clear. The strategies outlined above, which were developed according to the recommendations of central African participants from the Dzanga-Sangha region, can already serve as a starting point for planning and action. Solutions to the issue of human migration must be integrated at the trilateral level, among CAR, Cameroon, and Congo, so that a synthetic understanding of the interests in, and obstacles to, the sustainable development of natural resources in the Congo basin may emerge.

## REFERENCES

- Bahuchet, S. 1985. *Les pygmées Aka et la forêt centrafricaine*. Paris: Selaf.
- Cocquery-Vidrovitch, C. 1969. *Brazza et la prise de possession du Congo (1883-1885)*. Paris: Mouton.
- \_\_\_\_\_. 1972. *Le Congo au temps des grandes compagnies concessionnaires (1898-1930)*. Paris: Mouton.
- Freudenberger, K., and B. Bruce. 1997. Démarche pour comprendre et influencer les comportements. l'Égard de la conservation et de la gestion des ressources naturelles. *Bulletin sur la Biodiversité Africaine* 4.
- Freudenberger, M., Z. Mogba, Z. Henri, et al. 1997. *Les impacts de la migration sur les ressources forestières et aquatiques à la périphérie de la réserve de Dzanga-Sangha, Bayanga*. Washington, DC: WWF.
- Géosynergie. 1997. *Les menaces du front diamantier de Bouanda dans la réserve de Dzanga-Sangha, Bangui*. Central African Republic: Université de Bangui.
- Giles-Vernick, T. 1996. *A dead people? Migrants, land and history in the rainforests of the Central African Republic*. Ph.D. dissertation, John Hopkins University, Baltimore.
- Gueye, B. and K. Freudenberger. 1991. *Introduction à la méthode accélérée de recherche participative*, 2<sup>nd</sup> Edition. London: IIED.
- Landry, B. 1997. *Gestion forestière et exclusion socio-juridique des Pygmées BaAka dans la réserve de Dzanga-Sangha*. Central African Republic: Géosynergie, Université de Bangui.
- Lydie, M. 1997. *L'économie de raphia et le enjeux de conservation durable des ressources naturelles dans la réserve de Dzanga-Sangha*. Central African Republic: Géosynergie, Université de Bangui.
- Mogba, Z. 1996. *Évaluation participative de la dimension de la participation des acteurs socio-économique sur le bassin versant du Lac Tchad en République Centrafricaine*. Bangui, Central African Republic: Global Environment Facility/PNUD.
- Mogba, Z. et al. 1997. *Migrations et enjeux de gestion durable des ressources naturelles à Salo, Bayanga*. Washington, DC: WWF.
- Suret-Canale, J. 1962. *Afrique noire à l'ère coloniale: 1900-1945*. Paris: Editions Sociales.

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