



## **An Ecological, Socio-Economic and Conservation Overview of Northwestern Guinea**

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# Chapter 1

## An ecological, socio-economic and conservation overview of Northwestern Guinea

*Heather E. Wright and Jennifer McCullough*

### INTRODUCTION

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Originally, the Upper Guinea Forest ecosystem is estimated to have covered approximately 420,000 km<sup>2</sup>, but centuries of human activity have resulted in a loss of more than 70% of the original forest cover (Bakarr et al. 2001). This forest ecosystem extends from Guinea into Sierra Leone and eastward through Liberia, Côte d'Ivoire and Ghana into western Togo. In addition to its high concentration of biodiversity, the Upper Guinea Forest provides West Africa with essential ecosystem services, including regulation and maintenance of air quality, contributions to the formation of rainfall and other weather patterns, storage of carbon dioxide, and prevention of soil erosion. The remaining Upper Guinea Forest is highly fragmented and restricted to a number of isolated patches acting as refugia for the region's unique species of flora and fauna. Though fragmented, these remaining forest 'islands' contain exceptionally diverse biological communities, distinctive flora and fauna (including endemic species) and a mosaic of habitat types.

Adjacent to the Upper Guinea Forest ecosystem, the Guinean mangroves are part of a stretch of mangrove forest that extends intermittently along the West African coast from Senegal to Nigeria and Cameroon, forming bands as wide as 50 km in some places and extending far inland along many rivers. Guinean mangroves, influenced by a large tidal range and high inputs of freshwater, contain stands that are more than 25 m in height and extend as far as 160 km inland. The West African coast has the most extensive mangroves in Africa with the best-developed areas being found in Guinea and Guinea-Bissau (Hughes and Hughes 1992). As the best developed mangroves in western Africa, the Guinean mangrove zone provides important habitat for migratory birds and endangered species such as the West African manatee and the pygmy hippopotamus (WWF 2004) as well as critical habitat for a wide variety of fishes and invertebrates.

The underlying causes of biodiversity loss in the Upper Guinea Forest and adjacent coastal and marine ecosystems include extreme poverty, growing human population densities and weak environmental governance (Bakarr et al. 2001). The Guinean mangrove habitat has been affected by poor rainfall over the entire region during the past three decades. Despite the importance of this region for mangroves, relatively few are protected although the Parc National Delta du Saloum was created specifically to protect mangroves in Senegal, and Guinea has begun to develop a mangrove management program (CEC 1992).

Guinea's various ecosystems have not been well studied and the associated biodiversity is poorly documented. While the Upper Guinea Forest harbors a unique assemblage of ecosystems, it also holds significant geological wealth, including one third of the global bauxite reserves and large reserves of iron, diamonds, gold, uranium, and limestone (GEF 2004). Guinea is the world's second largest bauxite producer. Biological data are needed to determine how to best safeguard these natural resources to the advantage of local communities and regional biodiversity.

## Geography

Situated on West Africa's southwestern coast, the Republic of Guinea has a total area of 245,857 km<sup>2</sup>. Guinea has a rich heritage of biological diversity that is unique to West Africa, notably in its humid, dense forests that are part of the great Guineo-Congolaise tropical forests. Guinea is located at between 7°05 and 12°51 latitude North and 7°30 and 15°10 longitude West, placing it about midway between the Equator and the Tropic of Cancer. Guinea is comprised of an alluvial coastal plain, the mountainous Fouta Djallon region, a savanna interior, and the forested Guinea Highlands, which rise to 1,770 m in the Nimba Mountains. The country is divided into the following four distinct ecological regions: Guinée Maritime (western Atlantic coast), Moyenne Guinée (along the Fouta Djallon massif), Haute Guinée (northeast) and Guinée Forestière (southwest). These regions differ in their topography, climate, soils and majority ethnic group. In terms of administration, the country is divided into 7 administrative regions: Boké, Kindia, Mamou, Labé, Faranah, Kankan, N'Zérékoré and also Conakry, Guinea's capital.

## Climate

Guinea's hydrological network is dense with several large rivers originating in the sub-region. The coastal and much of the inland region have a tropical climate with distinct dry and rainy seasons, a relatively high annual temperature, and high humidity. The climate is characterized by great regional variation, for example, rainfall ranges from 1,200 to 4,000 mm/year (GEF 2004). Guinea's rainy season lasts approximately six months from late May through November.

## Vegetation and Habitat Diversity

The Guinean forests form the westerly part of what is known as the Guineo-Congolian regional center of endemism (defined by White 1983) and they are situated within the West Africa Hotspot. Although biogeographically distinct, the hotspot is comprised of the Upper Guinea Forest block, which extends from Guinea to Togo; and the Nigeria-Cameroon block (Mittermeier et al. 2005). The two major forest blocks in this hotspot also correspond to two important centers of endemism: Upper Guinea, which corresponds to that portion of the hotspot west of the Dahomey Gap (which separates the two forest blocks) and the Nigeria-Cameroon border region including Bioko Island (Mittermeier et al. 2005).

Plant distribution in West African forests show close affinity to the forests of Central Africa, with the majority of plant genera being widespread in both regions. Site-specific studies conducted in different countries also show high levels of local endemism, which is likely reflective of the region as a whole. For example, of 1,300 species in Taï National Park in Côte d'Ivoire, nearly 700 (54 %) are confined to the Upper Guinea forest ecosystem and 150 are endemic to the Taï area itself (Davis et al. 1994).

In terms of vegetation, Guinea is comprised of a range of vegetation zones from savannah, mangrove, dry forest

and moist, dense forest. The approximate original extent of closed canopy tropical moist forest cover in Guinea, including lowland, montane, swamp, and mangrove forest, once was 185,800 km<sup>2</sup>. Today, an estimated 7,655 km<sup>2</sup> of this forest cover remains (or 4.1 % of the original closed canopy forest; Sayer et al. 1992) with an average annual loss of closed canopy forest in Guinea of 1.8 % between 1981 and 1985 (WRI 1992).

Guinea's coastline, which is characterized by numerous estuaries, comprises large areas of mudflats and sandbanks that are exposed at low tide. Until fifty years ago, the entire coastline, except for a short section near Conakry, was lined with mangroves. In recent years, however, much coastal forest has been cleared for agriculture, creating substantial gaps in this mangrove belt. Guinea's coastal ecosystem holds 305 km<sup>2</sup> of intertidal flats, 2,230 km<sup>2</sup> of mangroves, 755 km<sup>2</sup> of fresh or brackish water coastal marshes and 605 km<sup>2</sup> of inundated ricefields (Robertson 2001). The mangrove ecosystems surveyed in Guinea's coastal region are part of an extensive mangrove forest that stretches along the coast of West Africa from Guinea Bissau to Nigeria and Cameroon. West African mangrove swamps are located on the flood plains of rivers and creeks and along the Atlantic coast. This environment is highly variable in terms of rainfall, soil, and environmental stresses.

## Biological Diversity

The biologically rich Upper Guinea Forest hotspot contains a high degree of species endemism and many of the endemic species have highly restricted ranges within the hotspot, making many of them extremely vulnerable to forest destruction (Mittermeier et al. 2005). Consequently, the high degree of species endemism found in the Upper Guinea Forest ecosystem makes it a high global conservation priority. The region's endemics include five Red Listed endemic freshwater crabs and an exceptionally high number of endemic bats and amphibians with restricted ranges, all of which are Critically Endangered or Endangered (IUCN 2004). In addition, the remaining patches of the Upper Guinea Forest are refuges for the region's unique species, including the chimpanzee (*Pan troglodytes verus*, EN) and pygmy hippopotamus (*Hexaprotodon liberiensis*, VU).

## Geology

In West Africa, almost the whole of the Guineo-Congolian Region is underlain by Precambrian rock. The landscape is formed of relatively low plateau and plains interrupted by residual inselbergs and small higher plateau. The most important of the latter are the Fouta Djallon, the Upper Guinea Highlands, and the Togo-Atacora range (White 1983). Almost all land areas in the Guineo-Congolian Region have an altitude of less than 1,000 m asl. The Guinea Highlands attain 1752 m in Mont Nimba and 1947 m in the Loma Mountains. In contrast to the Fouta Djallon, the Guinea Highlands have few level surfaces and the hills are rounded (White 1983).

The Guinean coastal zone encompasses the coastal plateau, a geographical region that ranges from 20 to 80 km in width and is juxtaposed with the foothills of Fouta Djallon. It supports most of the area's infrastructure and is covered with highly degraded, lateritic, sandy and relatively infertile soils used for slash-and-burn agriculture (e.g. cultivation of rice, groundnut and fonio), and for crops such as oil palms (GEF 2004). Guinea's mangrove environment, situated along this coastal zone, consists of an underwater sedimentary substrate covered with salt-tolerant vegetation. It is crisscrossed with numerous watercourses due to the large volume of the various watersheds feeding it.

## DESCRIPTION OF THE RAP STUDY SITES

The RAP survey took place from April 22 to May 12, 2005, at the end of the dry season and beginning of the rainy season, and covered three sites that were situated within northwestern Guinea's Boké Préfecture.

**Sarabaya** (10°45.248'N, 14°26.980'W), Site 1, included a complex of mangrove forests, intertidal mud/sand flats and freshwater marshes along the Rio Kapatchez, which is a designated Ramsar site. This site also contained a matrix of vegetation made up primarily of wooded grassland and a narrow band of gallery forest along the Rio Kapatchez. The RAP camp was located near the Sarabaya village and was based at this site from April 23 to April 28, 2005.

**Kamsar sub-préfecture** (Site 2) consisted of five subsites: Taïgbé East, Taïgbé West, Kaiboutou, Tarénsa and Kataméne. The RAP team was based among these sites from April 29 to May 3, 2005. The majority of this site was under cultivation with little remaining natural habitat. **Taïgbé East** and **Taïgbé West** were small islands with significant mangrove stands. Taïgbé East's (10°37.323'N, 14°34.061'W) vegetation was predominantly wooded grassland, coastal and estuarine mangrove forest remained in small patches. Taïgbé West (10°36.508'N, 14°36.232'W) had a small area of palm forest remaining interspersed amidst the remaining coastal and estuarine mangrove forest patches. **Kaiboutou** (10°37.331'N, 14°31.353'W) was comprised of large areas of cultivated land and as a result, large plantations. **Tarénsa's** (10°44.122'N, 14°33.559'W) vegetation was very similar to Kaiboutou with some degraded mangrove vegetation. **Kataméne** (10°52.433'N, 14°22.709'W) was the only site in this area that had any significant forest remaining. The surrounding area was wooded grassland similar in species composition to Kaiboutou.

**Boulléré** (11°6.558'N, 13°57.401'W), Site 3, situated within the Sangaredi sub-préfecture, consisted of a mosaic of vegetation ranging from gallery forest to open grassland to rocky outcrops of bauxite. The vegetation was highly disturbed by agriculture due to a number of settlements in the area however there were some intact gallery forest patches

remaining. The RAP team was based at this site from May 4 to 9, 2005.

## Population Profile

With a total estimated population of 8.2 million and a population density of 30 people/km<sup>2</sup>, Guinea was ranked 161<sup>st</sup> (out of 174) in the 2000 World Bank Atlas ratings (GEF 2004). The annual rate of population increase is thought to be 2.6%. There are more refugees seeking refuge in Guinea than in any other African country, as a result of civil conflict in Sierra Leone, Liberia and Côte d'Ivoire. At the end of 1996 it was estimated that there were about 650,000 refugees in Guinea from Liberia and Sierra Leone combined (UNHCR 1997). Konomou and Zoumanigui (2000) report a refugee population of 629,275, mostly concentrated in Guinée Forestière (southeastern Guinea). Thus the pressure on the natural resources of this region has increased enormously in recent years.

## Economic Activity

Guinean livelihoods depend greatly on the country's extraordinary floral and faunal resources. Households get 99% of their energy from wood fuels and traditional medicine practices account for 80% of the healthcare administered in the country (GEF 2004). The country also harbors a considerable wealth of geological resources, including one third of the world's bauxite reserves and large reserves of iron, diamonds, gold and uranium. As a result, the Guinean economy relies heavily on agriculture and commercial mining. Mining accounts for 80% of Guinea's export income and 17% of the GDP while 80% of the population relies on agriculture for their livelihood (11.2% of the GDP) (GEF 2004).

## Legal Protection Status

Guinea is one of 150 member countries of CITES and has ratified the Convention Concerning the Protection of World Culture and Natural Heritage (World Heritage Convention, Paris, 1972) and the Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the Western and Central African Region (Abidjan, 1981). Guinea has signed but not ratified The African Convention for the Conservation of Nature and Natural Resources (ACCN) (Barnett and Prangley 1997).

In Guinea, the governmental body responsible for wildlife is the Ministry of Agriculture and the Direction Nationale des Eaux et Forêt (DNEF). The law governing the use of wildlife is the "Code de la Protection de la Faune Sauvage et Réglementation de la chasse" (République de Guinée, 1988). Drafted in 1988, adopted in 1990 and amended in 1997, in this code species are listed as either (1) integrally protected, (2) partially protected, or (3) other species. Species that are integrally protected cannot be hunted, captured, detained, or exported (except if a scientific permit is obtained from the government). The penalty for hunting, capturing or detaining an integrally protected species is between six months to one year in prison and a fine of 40,000 to 80,000 FG, or one

of these two penalties. For species that are not specially protected, hunters must obey the “Réglementation de la chasse” and must have a permit to hunt, can only hunt between 13 December and 30 April, and only between sunrise and sunset (Kormos et al. 2003).

### Regional Political Context

Political stability within Guinea appears to have solidified over the past few years, but is by no means certain. Thus, refugee influxes and internal displacement of Guineans remain distinct possibilities in the foreseeable future. Camps operate near N'Zérékoré, Sérédou, and Kouankan, housing refugees from both Liberia and Sierra Leone. UNEP (2000) documents the environmental challenges that have accompanied the presence of a large refugee population in southeastern Guinea, and the potential for still further increases in the refugee population must be acknowledged. For instance, if the situation in Côte d'Ivoire further deteriorates, streams of new refugees may flow into Guinea's Beyla préfecture (Tahirou 2002).

### Threats to Biodiversity

The overarching drivers behind biodiversity loss in the Upper Guinea Forest and the adjacent coastal and marine ecosystems within a national context are a result of the growing population, extreme poverty and ineffective environmental governance. Three of the most urgent proximate threats to biodiversity in this area are bushmeat trade (commercial hunting), agricultural expansion and uncontrolled logging (Bakarr et al. 2001).

Conservation International together with Alcoa and **Guinée Ecologie** conducted a **two-day multi-stakeholder workshop (IBAP)** in June 2005 **to form an action plan for conserving biodiversity in the Boké Préfecture of Guinea**. In addition to the main threats noted above, additional adverse impacts to biodiversity identified in the **workshop** were caused by human disturbance and pollution of water-courses, poor agricultural practices, small scale diamond and gold mining, weak institutional capacities, commercial overexploitation of marine resources and coastal erosion.

The RAP team confirmed a high degree of anthropogenic disturbance in the survey areas. In particular, as a result of frequent fires and burning (from agricultural practices), forests were impacted by the loss of the buffer vegetation, which resulted in much lower than normal humidity. It was noted that salt production and clearance for rice fields have contributed to the decline of mangrove and estuarine habitat. In addition, demand for *Rhizophora harrisonii* as fuelwood in the growing towns is exacerbating the degradation of this habitat and altering the composition and diversity of the area. Evidence of hunting was apparent, as sightings of mammals were infrequent and local hunters reported a decline in large mammal species and a demand for bushmeat.

The majority of the population resides in rural areas and their livelihoods depend largely on the exploitation

of the surrounding wealth of natural resources, placing considerable pressure on the forest, soil, aquatic and mining resources. In addition, periodic but persistent civil unrest has hampered long-term conservation efforts by limiting the development of human capacity and by weakening the enforcement of certain conservation laws (Bakarr et al. 2001). Mass movements of refugees and internally displaced people have intensified pressure on forest resources, particularly in the border areas of Liberia, Sierra Leone, Côte d'Ivoire and Guinea.

Perhaps the most daunting fact confronting conservation planning is that some of the poorest people in the world live in Guinea. Moreover, their means for sustenance and livelihood are limited almost entirely to forest-based income. At least 90% of all energy consumption in Guinea is in the form of wood and charcoal (MMGE 2002). Agriculture, which accounts for around 85% of employment in the region, depends on conversion of forest areas to cultivation (MMGE 2002). Nearly 140,000 ha of forest are destroyed each year in Guinea (MMGE 2002). Bushfires damage vast areas of the country every year. At least 17 of 190 mammal species in Guinea are threatened with extinction, and at least 24 of over 600 bird species known from Guinea are of global conservation concern. At least 36 plant species are also globally threatened. Bushmeat hunting, urbanization, refugee flows, and illiteracy rates approaching 70% also pose obstacles to conservation efforts.

The four pillars of the National Biodiversity Action Plan of Guinea's strategy to conserve biodiversity in the face of the aforementioned threats are: the creation of a representative protected area system, inclusion of local communities through participatory management arrangements, the development of human capacity to fulfill a wide range of conservation roles, and the reinforcement of local, regional, and international cooperation in conservation efforts (MMGE 2002).

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