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SIERRA LEONE

118/119 BIODIVERSITY REPORT FOR SIERRA LEONE

USAID/Sierra Leone

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THE COUNTRY BACKGROUND TO BIO- DIVERSITY IN SIERRA LEONE

Sierra Leone with a land area of approximately 72,300 km ^{2} is among the small countries in the Upper Guinea rain forest regime. It lies between latitudes 6 ^{o} 55' and 10 ^{o} 00' N and longitudes 10 ^{o} 00' and 13 ^{o} 17' W . The country shares borders with two other West African countries (Guinea and Liberia) and the Atlantic Coastline, which stretches approximately 400 km long.

The climate is essentially tropical, with mean monthly temperatures around 26 ^{o} C. Solar radiation is high, with high humidity occurring during the wetter months of the year.
However, the cold and dry winds blowing across the Sahara Desert cause the humidity to be low and pleasantly comfortable during the months of December to February, which are essentially dry season months. Comparable cool months in the wet season are July and August. There are essentially two seasons, wet (May to October) and dry (November to April) seasons. Although there are distinct dry and wet seasons, the distribution of rains is considerably variable. Around the Number Two River in the Freetown Peninsula, rainfalls of 5000 mm per annum have been recorded. There is a general decrease in rainfall as one moves from the coast into the interior, with the North of the country receiving the lowest rainfall. The mean annual rainfall in this region is 2000mm with some months recording virtually no rain.

The country is divided into four main relief regions: Coastline, interior lowland plains, interior plateau and mountains. The coastline or coastal plains is relatively gentle and comprised of estuarine swamps, terraces, alluvial plains and beach ridges. The alluvial lowland plains extend from the coastal terraces in the west to the east of Sierra Leone occupying approximately 43 percent of the land area. At the edge of the lowland plains are the interior plateaus, made up of granite that run from the Northeast to the Southeast of the country. They seldom rise above 700m and are comprised of alluvial ironstone gravel in the Southeastern region, while the Northern end is comprised of weathered outcrops of granite rocks. In the North and East of the country are found two of the highest mountains, with the Loma Mountains being the highest in West Africa, West of Mount

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weathered outcrops of granite rocks. In the North and East of the country are found two of the highest mountains, with the Loma Mountains being the highest in West Africa, West of Mount Cameroon. The highest peak in the Loma Mountains is Bintumani and rises to 1945 m while SanKan Biriwa on the Tingi Hills rises to 1805 m. West of these two mountains, is the Freetown Peninsula, which is also made up of dissected peaks, with the two highest peaks being Sugar Loaf and Picket Hills. The hills on the Freetown Peninsula are unique to this region and found nowhere else in the Sub-region. The soils of Sierra are ferralitic and excessively leached as a result of the humid tropical conditions. This is particularly true for the upland soils with such common minerals, as calamite; aluminum and iron organic matter content is low, making the soils less suitable for cropping. In contrast the inland valley swamps are hydromorphic and relatively fertile and suited for rice cultivation.
It has been estimated that 70 percent of the country was at one time forested. The current distribution of forests hardly conveys that, with just under 5 percent of the country under mature forests. Human impact on the vegetation has been the most severe, largely due to logging and slash-and-burn agriculture. Broadly classified, there are 7 vegetation types and these include moist rain forest, semi-deciduous, montane, mangrove, savannah, farm bush and swamp forests. Farm bush arises from slash-and-burn agriculture and is becoming the dominant vegetation type in Sierra Leone. The savannah is limited to the northern parts of the country and is increasingly being subjected to frequent fires. Most of the moist and semi-deciduous forests are located within protected areas, often on mountain tops and slopes.

Sierra Leone has an estimated population close to 5 million. Certain regions in the country carry the bulk of the population including the Freetown Peninsula, Bombali, Kono, Kenema and Bo Districts. The Northern part of the country is relatively sparsely populated. Sierra Leone's economy suffered a major stagnation (if not a regression) in the decade leading to the civil war and thereafter. A large number of people live below the poverty line. The economy was largely dependent on the extraction of minerals (such as Diamonds, Rutile and Bauxite) and subsistence agricultural practices. Nearly 80 percent of the labor force is engaged in agriculture, largely slash and burn, with rice cultivation making up the bulk of the subsistence activity. Cash crops in the form of cocoa and coffee are still exported on a small scale compared to countries like Cot 7 d'Ivoire and Ghana, which have plantations and a large share of the world market. Industrial development is still in the formative period with import substitution comprising the major industrial activity. Development in the country has stagnated for too long. Illiteracy is high, life expectancy low and large sections of the population remains unemployed, especially among the youths.

Located in the Upper Guinea Rain forest region, Sierra Leone is rich in both plant and animal life, as well as abounds with diverse natural ecosystems. Current estimates of the level of biological diversity that exits in the country are unreliable. However, there is no shortage of information regarding past biologic al inventories in the country. What is lacking is a collation of existing information to provide policy makers and other users of biological diversity the relevant information for planning and implementing conservation activities.
Human impact on the natural ecosystem and its resources has been severe. Once dominated by forest, the country now has less than 5 percent of mature forest remaining. Logging, mineral exploitation and slash-and-burn agriculture have all taken a toll on the country's rich biological life With nearly 28 categories of protected areas in representative ecosystems, the area coverage is still less than 4 percent of the land area, with nearly all of these protected areas suffering from inadequate

protection due to lack of manpower, technical support and financial resources. Sierra Leone has also gone through a costly civil unrest with severe impact on its human life and biological diversity.

THE CURRENT STATUS OF BIOLOGICAL DIVERSITY

There are two types of forests in Sierra Leone: Tropical moist evergreen forest and moist semi-deciduous forest. These can be further divided into mountain and lowland types.
The tropical evergreen occurs where relative humidity is high, annual rainfall is greater than 2,500mm and the dry seasons are not longer than 3 months. The Gola Forest reserve is predominantly lowland tropical moist evergreen rain forest with small areas of moist semi-deciduous forest. The moist semi-deciduous forest needs less total rainfall, 2000-2500mm annually with a four to five months long dry season. There are more deciduous trees (shedding leaves annually) but the total diversity of plants is less than in the tropical moist evergreen forest. The Loma Mountains, Tingi Hills and Tama Tonkolili forest Reserve all have moist semi-deciduous forests.
Widely spaced trees and tall grasses characterize savannah woodlands. These trees are fire resistant that grows only 7 to 9 m. high. The abundant elephant grass can grow as high as 3 to 4 m. The open savannah woodland supports a more limited variety of wildlife than the forest.
Boli- lands are depressions in the drainage areas of large rivers that flood in the rainy season, and by March are dry grasslands again. These areas provide fine grazing for buffalo because the soil is too moist for coarse elephant grass. Migratory waterfowl are attracted to the boli when the water regime begins to recede in December. The flooding and drying of the soil offers a wonderful environment for the tiny invertebrates, snails, and worms that the birds eat. However, boli- lands are also attractive for rice cultivation. Wildlife and people thus compete for these areas.

With its high rainfall, Sierra Leone has an extensive system of rivers and swamps. A variety of mammals, birds and reptiles are found in the water, on the rocks and sandy beaches or on the trees along the riverbanks. Rivers that periodically flood and dry in the rains and dries respectively have a variety of migratory bird species that nest on the exposed rocks and sandbanks. The palm nut vulture and the West African fish eagles are birds commonly seen perched on tree sandbars. Hippopotamus, Otters (river dogs) Crocodiles, Nile monitor Lizards are common riverine species in Sierra Leone. 8
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The continental shelf is about 125 km wide in the North around Yelibuya and tapers to only 13-km at Sulima in the South. The Coastline itself is about 560 km long and the shelf covers an area (up to 200m depth) of 50,000 km ^{2}. The Exclusive Economic Zone (EEZ) is 155,700 km ^{2}. The shoreline consists of a Western and Eastern part. The Western part has four large estuarine systems separated by rocky and sandy coastlines and the Eastern part consisting of about 280 km of almost unbroken steep sandy coast backed with swamp communities.

Fish stocks of Sierra Leone are the most diverse along the West Coast of Africa. Marine and coastal fish stocks of Sierra Leone can be classified into two broad categories based on the biology and physico-Chemical parameters of the environment. About 213 species of pelagic and demersal fish stocks have been recorded so far. The stocks can be classified into 3 categories from both biological and management point of view, namely; pelagic, Demersal and Shellfish (crustacea and Molluscs) The total biomass is estimated at between 300,000 and 700,000 Mt.

MAJOR THREATS TO BIOLOGICAL DIVERSITY

Trends in threats of resource use in Sierra Leone over the years have depended on the specific historical conditions that have existed over the years. Pre-colonial Sierra Leone was characterized by an increasing awareness of degradation of biological diversity. The formation of the Sierra Leone Forestry Department in 1911 was a direct result of surveys done on biological diversity. Thirteen forest Reserves were established. Research into conservation of biological diversity in post-world war era involved the introduction of quick growing tree species as a result of forest degradation due to population pressure.

The post independent Sierra Leone paid little or no attention to the conservation of biological diversity. Policies and strategies spelt out in development plans were characterized by apathetic attitudes towards implementation. The status on the threatened animal species indicates that there are 761 species of mammals and birds. Of the bird species, six are threatened with extinction. There are 15 primates, all of which are either endangered or vulnerable. Of the 18 antelopes, two are extinct and the 16 are threatened. Other mammals like elephant and hippos have been drastically reduced. Of the birds, six are threatened. Biological diversity in Sierra Leone is faced with diverse threats including; logging for timber; fuel wood, charcoal and poles extraction, trade in bush meat and pets; slash-and-burn agriculture; mineral exploitation, civil conflict, over- fishing of marine resources; ill-conceived policies, conflicting mandates and poverty.

Logging for Timber**:** During the colonial period, the lowland rain forest of Sierra Leone provided the bulk of high quality timber for Britain to the extent that before independence, much of the timber resources along the coast had already been severely depleted. Whatever timber remained was in the

interior and this also came under severe assault as logging companies pushed further into those areas with no proper management after felling the timber, slash-and-burn agriculturists were quick to move into the areas vacated by the logging companies. Most of these sites received little or no attention in terms of replanting or engaging in regeneration activities.
In recent times the level of illegal logging activities has become unprecedented. During the civil conflict, most of the timber needs of Freetown were met from the Western Area Forest Reserve as access to the interior was effectively restricted by the rebels. Two timber species were the focus of intense exploitation and included *Heritiera utilis* and *Terminalia ivoriens*i. Even though illegal logging activities still go on in the Western Area forests, attention has been directed to the forest Reserves in the interior, most of which lack effective management. Because forest reserves offer limited protection for most wildlife, logging activities coupled with hunting is a potentially devastating combination for forest biological diversity.

Fuel Wood, Charcoal and Poles Extraction: The lack of cheap and affordable electricity and fuel (kerosene) in the Urban as well as in the rural areas, mean that energy needs have to be met from alternative sources. The most common and frequently utilized energy sources are fuel wood and charcoal and the bulk of these come from the exploitation of preferred species from lowland rain forests, mangrove swamp forests and the Lophira savannah in the North of the country. An estimated 85 percent of the Sierra Leonean population is dependent on the use of fuel wood and charcoal for domestic heating and cooking. This percentage is expected to rise as the population increases and no investment is made in the production of modern electricity needs. On a daily basis, one can see many heavy-laden truckloads of fuel wood and charcoal being brought to Freetown. Most of the coastal mangrove swamp forests have become depleted as demand for wood for fish smoking and evaporation of salt has laid to waste vast areas of former prime mangrove swamps. This practice has been identified as detrimental to the breeding of marine biological diversity. Construction poles also form a significant portion of the non-timber forest products extracted from the lowland rain forest ecosystem. Farm bush form the preferred sites for the exploitation of poles with *Anisophyiles laurina and Pentadesma bulyraceae* comprising the bulk of poles brought into Freetown for sale.

Bush meat and Pets: Bush meat is an important protein source from wildlife, and forms an integral part of the diet of rural and urban populations. All manner of wildlife is hunted for the increasing bush meat trade and in all the big towns and cities, there is increasing demand for the meat of wild animals, which generates a considerable amount of income. Even threatened and endangered wildlife have not been spared from this trade and throughout many of the protected areas, hunting pressures are on the rise. Recent surveys point to the near extinction of the red colobus monkey (*piliocolobus badius badius*). Perhaps more devastating to the wildlife population of this country is the taking of wild animals for trading as pets.
Chimpanzees (*Pan troglodytes verus*) are endangered in West Africa, but form the bulk of wild animals captured for the pet trade. Even though there is legislation against the capture of chimpanzees as pets, the laws are not strictly enforced and continue to deplete the wild population.
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Slash-and-burn Agriculture: Slash-and-burn agriculture has been blamed for the large-scale deforestation of Sierra Leone's forests and continues to degrade the remaining forest as fallow periods fall with increasing human population. On some of the most difficult terrains (steep slopes), farmers perilously stake claims to land for the cultivation of crops. Such sites are prone to erosion

and are known to lead to the impoverishment of biological diversity. Most farming activities nowadays, extend very close to the riverbanks, and potentially result in siltation of freshwater streams and rivers. The by-product of slash-and- burn agriculture is farm bush and is increasingly becoming the dominant vegetation in most areas in the country. This is occurring at the detriment of species dependent on high forest.

Mineral Exploitation: Sierra Leone is rich in mineral deposits in almost all of the ecosystems and all these have been under either artisan or industrial scale mining schemes at one time. Diamonds, iron ore, Rutile, bauxite, gold, granite, chromites and platinum are some of the diverse mineral wealth of Sierra Leone and many of these are still in production. The operations of many of the mining companies in the past were not subjected to environmental impact assessment, which have led to the most devastating mining practices in the history of this country. Deforestation, siltation and displacement 14 of human population have potential impact on the biological diversity of the country. In most forested areas of the south and East of the country, artisan mining also results in the exploitation of wildlife, with a large number of domestic and migrant hunters supplying the bush meat needs of miners.

Civil Conflict: The war was equally damaging to the environment, as the breakdown in law and order led to unprecedented exploitation of both land and marine resources.
Illegal logging activities in all protected areas increased and brought with it the attendant problem of creating easy access to remote parts of the forest for hunters. Trade in wild animal pets involving chimpanzees rose as did the demand for bush meat in most urban centers. The large number of displaced and unemployed refugees eked out a living by exploiting forest resources at unsustainable levels. Marine Resources were also over exploited by foreign fishing vessels as resources needed for patrolling the vast ocean expanse were lacking. In the Outamba Kilimi National Park, a large herd of buffalos, primates and hippos were reported slaughtered, while in the Gola rainforest, illegal logging activities are reported to be going on at an alarming rate.

Over-fishing of Marine Resources: Sierra Leone's marine resources, particularly fishes and shrimps, are under immense pressure for over-exploitation, with many raising concern about the long-term sustainability of current exploitation levels. *Sardinella Maderensis and Ethmalosa fimbriation* are reported to be the most exploited fish species in the marine ecosystems and *Penaeus notalis* being the most exploited shrimp species.
Most foreign trawlers are not effectively patrolled to avoid over exploitation. Artisanal fishing has also come under fire for unsustainable practices involving the use of beach seine netting. The mesh sizes involved are small (usually less than 25 mm diagonal stretch length) are considered illegal by Sierra Leonean law. They are extremely detrimental to marine resources as they take even the smallest fishes and shrimps that could have grown up to form the next breeding population. Around the mama beach another 15 unsustainable exploitation of marine resources involving the defining of sharks has been observed.

Ill-conceived Policies: In the early 1940s and throughout the 1950s, the Agricultural Department in the colonial administration implemented a pest control policy that became known as "monkey drive". Numerous complaints by farmers of crop damage by monkeys resulted in a bounty being offered for the head of every dead monkey. This laid the foundation for migrant hunters from

Liberia to move into Sierra Leone and killed an estimated 254,000 monkeys of all species in just under a ten year period. By the time this policy was brought to a halt, severe damage had already been caused to most wildlife to the extent that their populations never fully recovered. In recent time, the Department for International Development (DFID) provided a dozen chair-saws to several Paramount Chiefs throughout Sierra Leone under a Good Governance Program. The aim was to allow them to exploit timber resources for reconstruction efforts in their chiefdoms. This is an unfortunate and ill-conceived idea and policy as most of these saws could end up being used in illegal logging activities in the forest reserves.

Conflicting Mandates: The Forestry Division in the Ministry of agriculture, Forestry and Food Security has overall jurisdiction for managing the biological diversity in four of the five ecosystems including lowland rain forest, montane, savannah and wetland ecosystems. The management of marine resources is under the Ministry of Marine Resources and Fisheries. There is a small understaffed Wildlife Conservation Branch (WCB) under the direct control of the Forestry Division. Most of the resources are disproportionately allocated to the forestry sector and in terms of staffing, technical support, logistics and national recognition; the Forestry Division is by far ahead of its subsidiary. There is a complete lack of professional staff in the Wildlife Conservation Branch that is contrary to what obtains in the Forestry sector. The difference in the level of training of staff members is very striking, with most senior staff in the Forestry sector having the equivalence of a past graduate degree (M.Sc.) while the most senior staff at (WCB) has the equivalence of a two-year diploma. In addition the focus of the Forestry sector is largely on timber and the exploitation of other minor forest products, which 16 occur at the detriment of forest biological diversity. In the non-hunting forest reserves, timber exploitation is not carried out in concert with wildlife management. More often than not, there are more foresters present in the forest reserves than wildlife personnel are.

Poverty: Poverty is of the biggest indirect threat to biological diversity in Sierra Leone. The majority of the population depends entirely on natural resources for their livelihood, which are often exploited emotionally. Such high demands coupled with unsustainable practices of exploitation and utilization has placed undue pressure on the natural resource base thereby considerably impacting negatively on biological diversity

Mission Response to These Threats

- Ensure that the recognized boundaries of each targeted P.A. are clearly and permanently marked and that suitable and prominent signage regarding their special status is placed at key access points. In cases where the limits may be in dispute, work with the local authorities and community leaders to re-establish the limits, registering them in the field with a GPS and later plotting them on official maps.

- Program Team prepares habitat restoration manual as a guide to the rehabilitation of areas within the Protected Area in need of improvement.

- Restoration and watershed management activities get underway with community assistance in designated forest compartments where they are required for watershed management and biodiversity conservation purposes.

- Determine the potable water supply circumstances of forest villages and consider development of safe, piped water in return for their agreement to protect watersheds.

- Forest resource development, agricultural improvement, soil and water conservation activities get underway in buffer zones, including with private sector interests (Tea Estates) in order to begin to ensure the sustainability of the watershed.

- Develop a methodology for transparently quantifying human impact on the protected areas as a key to gauging the compensatory measures that may be required to achieve conservation imperatives.

- NGO personnel, perhaps with technical assistance, undertakes feasibility studies for alternative income and employment generation activities. Companion studies on the micro-economics or business planning and market access elements are carried out to ensure that participants are fully likely to benefit from their participation in these activities.

- Program Team develops an annotated action-research oriented issues agenda as the basis for a modest program of research grants to be contracted with institutions like the BFRI and others, focused on forest ecology, natural forest management, biodiversity assessment, watershed management, co-management and other germaine topics.

- Alternative income and employment activities get underway among the target communities. Lead participants in each of the categories of AIG activities are chosen and their efforts monitored carefully as an indicator of successful performance for monitoring and evaluation purposes.

- Possible community support and working credit program elements are operationalized (e.g. water supply, seed supply, etc.).

- Identify keystone forest tree and plant species that might be re-introduced or whose populations need enhancement within the P.A. Study the methods for their regeneration including the possibility of direct seeding and the feasibility of planting seedlings.

- Develop a response to possible issues of crop-raiding by animal inhabitants of the protected areas.
- USAID/Guinea recently initiated a chimpanzee sensitization program. This program educates people, Guineans and expatriates alike, in the importance of chimpanzees and the negative effects certain behaviors have on chimps in Guinea. For instance, education regarding the danger of owning a chimp as a pet and the legal ramifications of trading in endangered species.

Relevance with the Mission Strategic Plan and Programs

The current Fragile Sate Strategic Plan of USAID/Sierra Leone is focused on a "more proactive approach toward the intensification of the management of the mined out land and agricultural land-use that helps to accommodate the very high population densities and leads to notable positive impacts on both food security and poverty alleviation.

USAID Sierra Leone's push for co-management of tropical forest resources and biodiversity conservation will also provide important cross-sector relationships and opportunities for synergy with other programs on the one hand and the local planning, management committees and the district councils on the other hand, helping local communities to analyze their impacts on and understand the inherent limitations of forest related land-use that will inevitably lead to an improved capacity that breaks the mold of uncontrolled subsistence use of bio-diversity. Without early and affirmative action, the natural resource and forestry base of the hill lands especially Freetown, now being inexorably degraded, will result in a declining spiral of production and productivity irreversibly linked to the destiny of both the people who now make increased use of them and downstream communities on the floodplains.

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Because of high migration rate to urban setting there is a mounting pressure, many of the marginal areas, especially in the hilly zones of the country are unfortunately now being treated as "open access resources" despite some official efforts to designate them as "protection areas".

Signatory Status

Sierra Leone is a signatory and a party to various regional and international treaties and agreements, which are related to or affect biological diversity.

The international conventions include:

(1) Convention on Biological diversity (CBD); (2) Convention on International Trade in endangered species of wild fauna and flora (CITES); (3) Convention on Wetlands of International Importance (RAMSAR); (4) Convention Covering the protection of the World cultural and Natural Heritage; (5) United Nations Convention on the law of the sea; (6) United Nations convention to combat Desertification (CCD); (7) United Nations framework convention on climate Change (UNFCCC) (8) Vienna convention for the Protection of the Ozone Layer; (9) Montreal Protocol on substances that Deplete the Ozone Layer and the London Amendments to the Montreal Protocol on substances that Deplete the Ozone Layer; (10) Basel convention on the control of Trans-boundary Movement of Hazardous wastes and their Disposal; and (11) Treaty Banning Nuclear Weapons Tests in the Atmosphere, in outer space and under water

The Regional Agreements to which Sierra Leone is a party include the:

(1) Convention on the African Migratory locusts; (2) Convention for co-operation in the protection and Development of the Marine and Coastal Environment of the West and Central African Region (WACAF); (3) Protocol concerning co-operation in combating marine pollution in cases of Emergency in West and Central African Regions (WACAF); (4) Bamako Convention on the Ban of the Import into Africa and the control of Trans-boundary Movement and Management within Africa of Hazardous Wastes; and (5) Convention Establishing a Permanent Inter-state committee for the control of Drought in the Sahel (CILSS).

Economy

Sierra Leone is an extremely poor African nation with tremendous inequality in income distribution. While it possesses substantial mineral, agricultural, and fishery resources, its economic and social infrastructure is not well developed, and serious social disorders continue to hamper economic development. About two-thirds of the working-age population engages in subsistence agriculture. Manufacturing consists mainly of the processing of raw materials and of light manufacturing for the domestic market. Plans to reopen bauxite and rutile mines shut down during an 11 year civil war have not been implemented due to lack of foreign investment. Alluvial diamond mining remains the major source of hard currency earnings. The fate of the economy depends upon the maintenance of domestic peace and the continued receipt of substantial aid from abroad, which is essential to offset the severe trade imbalance and supplement government revenues. International financial institutions contributed over $600 million in development aid and budgetary support in 2003.

Other Means to Address These Issues

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