

# Forestry Outlook Studies in Africa (FOSA)



## SIERRA LEONE

MINISTRY OF NATURAL RESOURCES  
AND TOURISM



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*Please note that the views expressed in this paper reflect those of the authors and should not be attributed to any of the institutions.*

*This paper has been minimally edited for clarity and style.*

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## SUMMARY

### A Brief on the Forestry Outlook Study<sup>1</sup>

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#### MICRO-ENVIRONMENTAL FORCES

##### Forest Management

There is inadequate staff and funding of the Forestry Division. Inefficient supervision of local pole supply contracts are affecting the protection of forests in the Western Area Peninsula forests. The Village Forestry Associations (supported by the Forestry Act, 1998) and the National Association of Farmers of Sierra Leone require support to facilitate community participation in forest management. There are important bird sanctuaries that are being protected and managed with GEF and other donor funding.

##### Forest Policy and Implementation

There has been a collapse of sector institutions due to the civil conflict.

- Lack of Inter-sector Cooperation: There is lack of coordination among the stakeholder ministries.
- Inefficient Forest Revenue Systems: A review of the revenue system to reflect market realities is required to increase benefits to forest-dependent communities so as to solicit their cooperation and also to facilitate adequate financing of forest management.
- Lack of Investment in the Forestry Sector: there is virtually no public or private investments in forest management.

##### Forest Industry

Under the trade liberalisation policy, the export of logs has been banned to promote local processing and employment generation. The export of lumber (except packaging wood) was also banned in 1990. Packaging wood is also a construction material for the poor in the country. Fiscal incentives have been given for the importation of sawmilling equipment. The importation of chainsaw as well as the trade in chainsaw lumber is unregulated. Plywood, particleboard, hardboard and match splint are imported. Returnees also import furniture. The logging and sawmilling industries have been affected by political interference and lack of transparency. Most of the machinery is also obsolete. There is lack of local skills in the wood industry sector.

#### MACRO-ENVIRONMENTAL FORCES

##### Energy

The majority of the population (95%) uses kerosene. Its price has been kept relatively constant by subsidy even though the petroleum price increase during the past decade averages 27%. Further increases in the high prices as well as the prices of kerosene and modern stoves will cause many people to switch to firewood.

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<sup>1</sup> FOSA website available at: <http://www.fao.org/forestry/FON/FONS/outlook/Africa/AFRhom-e.stm>

The consumption of firewood and charcoal is about 6.2 million m<sup>3</sup> and 396,000 m<sup>3</sup> roundwood equivalent. The 5MW Goma Hydro Electric dam relies on petroleum fuel during the dry season due to low water levels. There is a potential hydropower (i.e. the 305MW Bumbuna Hydro Electric Project) that is expected to be completed by the year 2004. The Bumbuna dam is expected to produce surplus energy for export to neighbouring countries. Other 24 potential hydro-electric sites appear to be under threat from shifting cultivation.

### **Deforestation**

Infrastructure development: There is the need for proper planning of infrastructure developments (e.g. roads, mining etc.) so as to minimise their effects on the forest resources.

Agriculture: The high prices of inorganic fertiliser encourages the cultivation of larger acreage.

The Institute of Agricultural Research and the Rice Research Station have sedentary farming packages for peasant farmers that are yet to be demonstrated in the field. This can have the effect of reducing pressure on the forests and the “uplands”.

### **Economic factors**

The economic performance has been poor. A trade deficit balance of about US\$34 billion was reported in the 1993/94 period. There is substantial illegal cross border trade in timber products (especially timber and charcoal) within the Mano River Union (MRU). This has been facilitated by the civil strife in the region that has created insecurity on the land and water routes linking the countries in the MRU. The high price differential between lumber from Sierra Leone and the neighbouring countries is also a contributing factor. Per capita income has been decreasing over the past two decades.

### **Demographic factors**

Population growth rate is about 2.5%. About 80% of the population is rural based. There has been about a decade of civil conflict with a resultant destabilisation of about 60% of the population, increased rural-urban migration, and migration outside the country. Among the issues to be addressed as a result of the civil conflict is the rehabilitation of returnees with its attendant requirements for building materials (the construction of about 300,000 housing units nationwide has been planned) and the provision of household energy that will have effect on the extent of forest extraction. There is a mass exodus of labour to the minefields. This has effected the labour availability for agriculture and forestry.

## **SCENARIO DEVELOPMENT**

The questionnaire technique was used to solicit opinions about the likely future impacts of the key driving forces on the forest resource base. Expectations or wishes for some identified driving forces as well as for some related potential projects for the year 2020 have been presented separately. Most of these portray negative trends. But the possibilities of the trends taking place, how they will take place and why are not explained well. In some cases, the actual effects of the forces have been predicted for the future.

The current states of the other driving forces and their future potential have also been described. Proposals are made with respect to policy and institutional changes that are essential to the challenges facing the forestry sector to year 2020. These include capacity building, community forestry development, restructuring/rehabilitation of the forest industry, improvements in inter-sector cooperation and the making of the Forestry Division a semi-autonomous institution so as to motivate and equip it to perform its functions more efficiently.

# 1. INTRODUCTION

## 1.1. Objectives

The main objectives of this study are as follows:

- To forecast the demand for forest products and services in the next two decades.
- To plan and execute supply of these products and services during the same period.
- To determine all the possible sources of impacts and influences on the demand and supply trends of those products and services during the period.

## 1.2. Background information

### 1.2.1. Mandate of the Forestry Sub-Sector

The mandate of the Forestry sector entails the provision of forest products and services to present and future generations of this country in perpetuity.

This is achieved through forest regeneration; protection; management; public sensitisation and awareness raising on topical conservation issues, in collaboration with allied institutions, NGOs, local communities and youth groups etc.

### 1.2.2. Structure of the sector

The Forestry sector of the present Ministry of Agriculture, Forestry and Marine Resources comprises of the large Forestry Conservation Section, a small Wildlife Conservation Unit and a Rubber Development Branch which production wing was privatised in 1994.

Other sectors of the present Ministry are: Agriculture, Livestock, Planning Monitoring and Evaluation, Land and Water Development and Agricultural Engineering. The Environmental Protection Sector which mandate is closely allied to Forestry was lost to the Ministry of Lands, Housing and Country Planning early this year but it might move again.

### 1.2.3. Staff Disposition

A total area of 507,700 ha comprising national forests, community forests, and wildlife protection areas is manned by followingly: 177 Forestry staff (90% in the Junior cadre) and 33 Wildlife staff (98% in the Junior cadre). The current protected area to staff ratio of 2418:1 is probably the most outrageous in the African region. At the moment, about 28 senior staff vacancies and 63 middle to Junior staff vacancies are to be filled (ref Annex 1-1).

Established in 1911, the challenges of the past 9 decades have not been adequately addressed by the present low staff strength and capacity.

### 1.2.4. The Forest Estate

Estimates of forest types by area contained in Annex 1.2 indicates that 60% of the nation's forest land area is occupied by forest regrowth. Unfortunately, this forest type

continues to expand rapidly at the expense of the closed high forests in particular, due to agricultural expansion, logging, mining and other life-sustaining activities.

Forests and other protected areas under government control presently occupy about 5-10% of the land area of Sierra Leone (see map 1.1). Attempts to expand areas under government control are frustrated by the fact that even the enlightened and resource-poor citizens very heavily depend on their land as the only means of livelihood and are least willing to dispose of it. The most frustrating aspect of the problem is that encroachment pressure on even the meagre forest estates under government control is on the increase. The post war situation could be worst considering the degree of lawlessness experienced behind rebel lines and the associated poverty and forest depletion imposed by the war.

In addition, about 18,000ha of rubber *Hevea brasiliensis* had been planted mostly in the Eastern and South Eastern regions in the early 60's. About 53,000 acres (21,285ha) of matured rubber estate was leased to the Sierra Rubber Company in January 1991. Operations should have started almost immediately but for the civil conflict that erupted close to the project site in March 1991.

Sierra Leone's closed forests form the easternmost extent of the Upper Guinea Forest Block extending from the Dahomey Gap to Guinea (see map 1.2). The largest of these, the Gola Forest complex has a high species biodiversity and endemism with endangered species such as the African elephant (*Lexodonta africana*), Leopard and about 9 endangered or threatened primate species. Cross border migration of elephants between Northern Sierra Leone and Southern Guinea and Eastern Sierra Leone and Western Liberia are issues of sub-regional importance which had been proposed for funding by the US Fish and Wildlife Service in December 1999 during the Workshop on Bushmeat Management.

#### 1.2.5. Funding and logistical support

The agriculture sector receives the Lion's share of the re-current national budget. The Forestry sector is marginalized and underfunded in a Ministry where the major focus is food production. In addition, government actually spends over 80% of the Ministerial budgets on staff remuneration with a staggering 20 % on the logistical support necessary for making the sectors operational.

However, the forestry sector had benefited from an UNDP/FAO intervention through a sector review and capacity building project, although the return of a majority of the trainees coincided with the escalation of the war in Freetown. This resulted in some additional brain drain. One output of the Capacity Building Project, the Forestry Planning Unit, could not be operational due to the pre-mature termination of the no-cost extension of that project in 1988 to be blamed on the deteriorating security situation.

#### 1.2.6. Potentials of the Sector

Membership of international conservation organizations and conventions such as CITES, Ramsar Conventions, CBD, UNFCCC, etc. continues to guarantee support to the country's forestry and wildlife sector. Previous studies aimed at the development of the sector including Philipson's report (1986); Forestry sector review (1990); Agric Sector Master Plan study (1994) and now the Forestry Outlook Study for Africa hold promise for the development of the sector.

The untapped potentials of the wildlife sub-sector in terms of tourist revenue; gate fees to protected areas; export of wildlife; game hunting and regulated bushmeat trade could be harnessed during the period under review.

## **2. THE CHANGE DRIVERS**

Most long terms forecasts like the FOSA, utilise past consumption data to determine the secular trends in consumption through the use of appropriate biometric methods to determine future trends “*cteris paribus*” (all thing being equal). The “*cteris paribus*” clause hardly holds even during peace time let alone in projecting demand for products in war-torn Sierra Leone.

While the normal change drivers or demand shifters apply in the Sierra Leone situation, the severity of the impacts of these factors may have been exacerbated by a decade of civil conflict.

The country’s population estimated at 4.3 million (1990) is believed to have increased at about 2.5% per annum (projected to 8.9 million in 2020) but a near-complete collapse of local government structures and the destabilization of about 60% of the population makes returnee population more crucial in the forecasting and supply exercise. Rural-urban migration and the seeking of refuge in neighbouring countries, poses entirely new questions i.e. How many refugees or IDPs will chose to make their host towns or countries a permanent abode?

Specifically, the following factors are most likely to affect the forecast and the balancing of the demand and supply equation:

- Housing and other needs of IDPs and refugees (including 149 office and residential complexes for returnee Paramount Chiefs).
- Population dynamics over the past decades.
- Rural –urban migration.
- Income distribution and changes in per capita income.
- Social indicators as they interpret the use of national resources.
- The role of tradition in conservation.
- Cross border trade and migration within the Mano River Union.
- Economic performance.
- Institutional strengthening.
- Impact of industrial development.

### **2.1. Housing and other needs for IDPs and Refugees.**

Annex 2.1 which presents the IDPs by present location and Chiefdom of origin clearly highlights the rehabilitation needs of the returnees in terms of housing, timber, fence sticks, firewood etc but it also highlights the need for the reforestation of areas in close proximity to the current camps which are being heavily depleted. In addition, the normal annual increases in housing units due to normal population increases should be accounted for, in terms of demand for construction material. Under the DFID good governance programme

149 office/ residential complexes will be built for returnee Paramount Chiefs. A reforestation programme involving all the 149 chiefdoms is being planned.

## **2.2. Population Dynamics**

Important aspects of the country's population worthy of note are:

- % youth population looking for jobs now.
- Population of children born in 2000 who will be available for jobs and require housing by 2020.
- % aging and aged.
- % immigration and migration.
- number of ex-combatants to be gainfully employed.

## **2.3. Rural – Urban Migration**

This factor, if accurately determined could guide re-afforestation programmes to cater for highly populated areas; adjust for the expansion of settlements in urban and peri-urban areas; plantation establishment drives etc.

The severity of the migration provides an indicator for rural development planning to contain the situation to some extent (see annex 2.3).

Where urban population growth outweighs the expansion or increase in facilities to cope with the excess population, health-related and other social problems could surface.

## **2.4. Changes in per capita income and income distribution.**

As another measure of poverty, changes in per capita income which has been decreasing over the past 2 decades will affect the degree of utilization of natural resources. Examples of the negative impacts of the deterioration of per capita income and skewed income distribution include:

- More people switching over to the use of firewood due to problems of affordability of modern stoves and also the increases in prices of petroleum products (see annex 2.4).
- High prices of inorganic (chemical) fertilizers could discourage the application of the correct doses (or outright rejection) of fertilizers. This situation could encourage the cultivation of larger acreage of the “upland” to account for the differential in rice “yield” due to partial or non- application of fertilizers.

Pressure on forests for wood energy will be exacerbated by increases in the pump price of kerosene which is the domestic fuel used by the majority of the population.

## **2.5. Social indicators as they interpret the use of natural resources.**

Factors such as the proportion of rural to urban based population; population distribution by standard age classes; urbanization and immigration trends; life expectancy; employment trends; proportion of literate population and literacy trends etc. tend to explain the heavy reliance on forests by particularly the rural poor.



## **2.6. The role of tradition and culture in shifting demand.**

Food avoidances and the avoidance of certain firewood species on the basis of superstition, culture etc could influence the choice of species in woodlot establishment (see annex 2.5). The maintenance of sacred groves that promote conservation could have a negative impact if such groves are targeted for large scale reforestation programmes.

Special diets may encourage over-consumption of fire wood e.g. the cooking of dried broad beans utilises large quantities of firewood.

## **2.7. Cross border trade within the Mano River Union.**

Apart from exports from main national ports, illegal cross border trade in forest products could be substantial especially by boat on the Freetown – Conakry and Freetown – Monrovia routes.

Since the land routes are only continually open and mostly insecure, this illegal trade in particularly timber and charcoal can not be ignored. Hence the need to make some estimated provision for it. Cross border migration of large mammals particularly of elephants could also affect the forecasts.

## **2.8. Economic Performance**

The balance of trade deficit is a realistic measure of the performance of the economy as a positive balance could ensure the provision of support to sectors such as forestry. For instance the visible trade balance for the period 1993/94 was USD 34 billion. Post war situation could be worst but recovery is anticipated with the diamond origin certification mechanism now put in place. Rutile accounted for 53% of the countries export earnings in 1993/94 followed by diamonds (32%); bauxite (7%); illmenite (5%) etc. With the cessation of hostilities in the main cocoa and coffee growing areas, more export earnings will be realised for the development of the natural resources. Air and sea vessels will increase in numbers thereby increasing revenue generation through landing fees, portage etc.

The on-going but gradual appreciation of the “Leone” against the dollar could improve the performance of the economy.

Aspects of the economy that could negatively impact on the use of natural resources are that of Economic and Trade liberalization. These factors will affect the following areas in particular:

- the unregulated importation of powersaws
- illegal exportation of sawn timber
- unregulated registration of timber stores
- duty waiver on sawmilling equipment
- company registration laws not fool-proof

Currently, there is a ban on log export on the grounds of local employment creation in remote areas by sawmillers.

## **2.9. Institutional Strengthening**

Recent changes in NGO/Government policy geared towards enhancing the efficiency of those institutions could result in positive impacts on natural resource management in the right geographical regions.

Avoiding duplication of efforts and ensuring coordination of efforts by all stakeholder ministries could be an added advantage.

Village Forestry Associations, fully supported by the Forestry Act 1988, should be encouraged under the broad community forestry development agenda which the sector is currently rigorously pursuing. Only indirect control of communal lands, outside forest estates, could increase the area of managed forest estates since the acquisition of new lands is becoming increasingly difficult.

The resuscitation of the District councils will discourage the present centralised financial management system, allowing the Districts and chiefdoms to participate in natural resources management more effectively. The reforestation programme sponsored by DFID could be commendable if effectively implemented.

The Native Administration forests which support waned over the last decade will once more be supported by local chiefdom authorities.

The present structure of the National Association of Farmers of Sierra Leone makes it a strong vehicle for the dissemination of ideas on tree planting and conservation messages to the grassroots level. Education of its membership through appropriate means for collaboration with this body could ensure:

- the protection of some valuable timber species during the post war rehabilitation of cocoa, coffee and oil palm plantations
- Protection of timber trees in cash crop establishment and maintenance
- Catchment protection during slash and burn farming practices
- Swamp development to reduce the pressure for farm land on the “uplands”.
- Agroforestry practices to be adopted in order to make the farmer more sedentary.

The Institute of Agricultural Research and the Rice Research Station, Rokupr both have packages worthy of field trials nationwide. Making the small farmer sedentary could reduce the impact of the shifting cultivation practices on the vulnerable “uplands”.

## **2.10. Impact of Industrial Development**

Once the demand for products and services is precisely determined, there will be need to balance the demand and supply through the assessment of what is available in terms of volume of timber etc. and how much needs to be planted.

In order to avoid clash of interests or even the possible destruction of young trees due to the need for road construction, mining and other activities, road construction and mining plans and plans for other allied institutions will be used to guide the re-afforestation programmes (see map 2.1 and 2.2).

Potential tourist attractions will continue to be conserved and the means of enhancing tourist turnover accelerated (see appendix 2.6). City and town planning departments will be encouraged to present expansion proposals for those settlements. Such proposals could also guide the forecast of timber and other construction – related needs. The quantum of forest vegetation in terms of area cleared and the volume of timber to be destroyed in road construction need to be estimated for planning purposes.

The availability of labour for agriculture (including forestry) will be investigated despite the usual tendency of a mass exodus of labour to the minefields.

The possibility of establishing of a sustainable and reputable forest industry is being pursued in light of the fact that no logging and sawmilling company is operating in the country at the moment.

The floating of indigenous logging and sawmilling companies will be encouraged to maximise return to local communities as financial incentives for forest reservation and in the interest of sustainability. Community heads will be encouraged to buy shares in these companies as a guarantee of their full support.

The impact of agricultural expansion and particularly the agricultural practices presently in place; holds potentials for improvement particularly the inculcation of more environmentally- friendly farming methods such as agroforestry practices and the use of other ecologies.

The protection of valuable timber species during cash crop rehabilitation will be emphasised. Out of a total area of 5,362,000 ha of arable land the uplands constitute 78.4 %; inland valley swamps (12.9%); mangrove swamps (3.7%); Bolilands (2.6%) and Riverine Grass lands (2.4%). Thus the cultivation of inland valley swamps; bolis and riverine grassland could reduce farming pressure on the upland.

Timber and bush pole requirement for the construction of 300,000 housing units nationwide will be determined and the supply mechanism instituted in collaboration with the Housing Division of the Ministry of Lands, Housing, Country Planning and the Environment. Construction wood needs for the 149 housing units for the 149 Paramount Chiefs will be calculated.

## **2.11. Response to questionnaires**

Change drivers will definitely have an impact on deforestation, conservation and rehabilitation programmes as exemplified by 46 respondents to questionnaires administered. (see annex 2.7)

While 75% of respondents agreed that population growth will fuel deforestation, about 45% feel that rural-urban migration will have same impact. Decrease in per capita income was blamed by 45% while only 33% blamed poor income distribution for fuelling deforestation.

Increases in poverty levels, wood energy prices and the price of rice were blamed for increased deforestation by 69%, 54% and 36% respectively, while support for resettlement and the return of returnees is blamed for deforestation by 31% and 37% respectively. Other possible future civil conflicts and the proliferation of NGOs were only blamed by 23% and 33% of respondents respectively.

On the impact of local government capacity on enhancing forest resource management, 47% was attributed to the reconstitution of District Councils; 50% to decentralization and 38% to the return of Paramount Chiefs to their respective chiefdoms. Proper coordination of NGO activities; the constitution of a national seed board and the establishment of a national forest tree seed programme will enhance management by 38%; 28%; and 45% respectively.

Agricultural expansion is one of the biggest culprits of deforestation. This was exemplified by 28% of the respondents blaming it on tractorization; 36% on food production campaigns; 33% on farmer empowerment and 33% on the introduction of the Unified Agricultural

Extension System. Unsubsidised fertilizer prices may create problem of affordability by most resource – poor farmers. Hence 29% of respondents expected that policy measure to fuel deforestation as larger parcels of land could be cultivated to make good the deficit in yield, due to the non-application of yield- increasing fertilizers. The cultivation of alternative ecologies such as inland valley swamps and mangrove swamps which cultivation could decelerate deforestation of dry land forests by 28% and 21% respectively.

Alternative energy sources could reduce the spate of deforestation mostly for obtaining biomass energy. Understandably, 50% of respondents supported the idea while 33% felt that increased demand for raw materials could fuel forestry development while another 50% felt that the additional shift of labour to industries could fuel development of the forestry sector.

The role of unemployment in fuelling deforestation was exemplified by the fact that 50% of respondents felt that industries to be developed in the next 2 decades can only absorb modestly, the additional labour produced by normal population increases. Only 38% felt that NGOs could adequately absorb some of the excess labour. However 50% felt that the positive impact of tourism on the economy in the next 2 decades will be substantial.

Alternative energy sources are often expected to reduce pressure on forests for biomass energy but only 28% blamed fuel price increases for deforestation while 40% blamed increases in the cost of cooking appliances. However 41% felt that the provision of cheap hydro electric power, following the completion of the Bumbuna project, will positively influence the use of electric cookers thereby reducing the dependence on biomass slightly. Forty percent expected the adoption of wood burning stoves to be high. However, 40% of respondents felt that the chances of harnessing other HEP sources are very low meaning that this alternative may not substantially contribute to curbing deforestation effectively.

As for the negative impact of road construction on forests, only 28% felt that it will be high in the next 2 decades, while 40% felt that development in communication sector will enhance forestry development.

Trade Liberalization affects forest harvesting and sale of products. Therefore 85%, 66% and 47% felt that the uncontrolled importation of powersaws; illegal exportation of forest products and the uncontrolled opening of timber stores fuel deforestation respectively.

In addition, poor interdepartmental collaboration and the illegal importation of powersaws were blamed by only 36% and 33% respectively.

Policy changes in the sector could enhance forestry development. While 78% felt support for community forestry could enhance forestry development, only 52% and 57% felt that the national tree planting drive and enhanced public awareness could do the same.

Fifty eight percent felt that technical training for NGOs in environmental conservation will enhance forestry development but surprisingly only 28% felt that education of powersaw operators, pit sawyers and charcoal burners will enhance forestry development. Contracting out seedling production and plantation establishment to local communities was supported by 50% of respondents, while 50% felt increased political will could enhance forestry development and 31% supported the sale of forest tree seedlings which are currently distributed free.

Technological changes in forestry and allied fields could enhance forestry development provided they increase wood recovery, enhance seedling production and build the capacities of stakeholder organizations.

While 40% of respondents felt that modernised sawmills would enhance forestry development, only 33% saw the advantage of “tubed” seedlings over naked ones in enhancing nursery productivity. In fact 38% actually advocated the direct broadcast of seeds on taungya farms. This method when successful, could reduce labour cost on land clearing and tree planting.

Support to and sensitisation of stakeholders (farmers/youths etc.) was advocated by 45% of respondents while the provision of tree felling and extraction equipment to facilitate firewood sales was not favourably supported by 60%. However the introduction of energy-efficiency charcoal kilns received 42% support.

Investment in the forestry sector did not receive a high rating. Respondents felt that the chances of investment are likely to be medium. Forty percent considered high investment in forest exploitation; 45% expect medium to average investment potential in re-forestation activities; 31% expected medium to average investment in national parks and wildlife management and 35% expected average investment in eco-tourism.

Also, 31% expected moderate investment in rubber exploitation; 26% in rubber plantation establishment and 33% in the establishment of zoos.

Potentials for donor intervention over the next 20 years was rated as 38% by the respondents. Forty percent of respondents felt that the negative impact of land tenure is high while the impact of livestock restocking is rated as moderate.

The limited adoption of agroforestry methods is expected to have negative impact. Increased globalisation trends could have a negative impact on forestry development due to increase in deforestation pressure.

### **3. FORESTRY SECTOR IN 2020**

#### **3.1. State of Forests and Plantations**

##### **3.1.1. Deforestation Pressure**

During the next 2 decades, the area of legally constituted forest estates will continue to decrease due to urban and agricultural expansion which will permanently change the landuse. In cases such as encroachments for mining, the forest land could be replanted at the end of the mining operation.

About 10% of the country's land area (both government controlled estates and salvage areas) comprising of closed forests would have been deforested at the rate of about 1.5% - 2.0% per annum thereby increasing the area under forest regrowth currently occupying 60% of the country's total land area.

### 3.1.2. Fate of Community Forests

Chiefdom Authorities would have succeeded in re-claiming most of the communal forests currently under government control mostly for agricultural expansion; the expansion of rural settlements; the establishment of new settlements etc. Road construction, particularly logging roads would have “opened up “ hitherto remote and inaccessible areas to further fuel encroachment on the estates and wildlife exploitation.

Natural regeneration of logged out forests will be adversely affected by the activities of shifting cultivators who would normally find it difficult to cultivate primary forests comprising of giant trees using rudimentary farming tools and the type of logging and extraction methods instituted.

### 3.1.3. Plantation Establishment

Replacement of natural forests with plantations of fast growing (relatively low quality timber) species will be the rule, on economic grounds, and probably due to the limited knowledge on the silviculture of the indigenous high value timber species. Funding possibilities permitting, plantations will expand at the expense of natural forests. Most of the mahoganies would have been seriously depleted except in strict Nature Reserves, provided these could be effectively protected.

Plantations established in the 60s to 80’s would have been harvested or naturally depleted and replaced to some extent. A few instances of *Gmelina arborea* and *Terminalia ivorensis* “die back;” currently experienced nation-wide, could have reduced the quality of the forest crop in the affected plantations. Due to the lack of maintenance, most of the forest crop in plantations will produce low value sawn timber. However, for plantations close to urban or highly populated mining areas, most of the unutilised wood could be converted to charcoal or sold as firewood.

Wildfire damage to both natural forests and plantations particularly in the drier northern and central districts is likely to increase due to the expanse of savannah lands.

### 3.1.4. Past Tree Planting Efforts

Since the inception of the national tree planting drive in 1985, tree establishment outside forest estates, either in towns or on small plots, continue to increase, albeit slowly. Some trees established in or around settlements had been destroyed by wild fires, vandalism, grazing pressure etc. However these trees or woodlots comprising mostly of *Acacia mangium*, *A. auriculiformis*, *Gmelina arborea* etc. would contribute significantly to firewood needs particularly in the drier northern and north central districts.

Between 1985 and 1995 the UNDP/FAO Fuelwood Project and PLAN International supported farmers to establish 1,000 ha and 400 ha of mostly *Acacia mangium* and *A. curculiformis* in the Western Area of the country.

Also, over the same period, the Rokel Leaf Tobacco Development Company supported contact farmers to establish a total of 800 ha in the northern province.

In addition, other agricultural projects with forestry components could have established another 400 ha nationwide. Some of these plantations would have been replaced at least once by year 2020.

### 3.1.5. Tourism and Biodiversity Development

By 2020, non wood forest products will be playing significant roles in terms of employment, tourism and rural development.

Rattan furniture production which started in the mid 90s would have grown to a reputable industry with costs slightly above that of timber furniture which only targets the local market, at least for now. In addition, raphia palm cane is widely used as furniture, doors, beds etc. in rural Sierra Leone. The sale of rattan household utensils along the highways to the East and South has become significant over the past decade and is likely to become lucrative, provided the producers get value for money rather than the middle man taking the lion's share of the profits.

During the next 2 decades, these sources of material would significantly supplement timber and contribute to timber conservation provided the source of the rattan cane is conserved and ideal replenishment methods instituted.

Honey production for the market has started gaining grounds and holds much potential for the future.

A soft drink manufacturing company – the Freetown Cold Storage, had already put honey on its shelves by 1992. A honey production association has been formed and a few expatriates have manifested interest in commercial honey production. Beeswax production also hold lots of potential for rural development.

Potential tourist hotspots have been identified by the Natural Tourist Board which is also working closely with the Forestry sector to develop projects to enhance tourism and rural development.

Tourist attractions such as the Africana Tokeh village, St. Michaels Lodge, Lakka Beach Hotel etc. which thrived well before the escalation of hostilities are likely to have developed effectively by 2020.

Biodiversity conservation would be more effective in the 8 important bird areas (IBAs) established in 1996. (See annex 3.1). With the continuous support of the Global Environmental Facility- funded “African NGO-Government partnership for biodiversity conservation project”, launched in April 99 to run till 2004, these IBAs would have been managed more effectively. The Outamba Kilimi National Park, (Sierra Leone's First National Park) would have been fully supported with funds from the EU and other donors.

Other proposed national parks, strict nature reserves, game sanctuaries etc. would have been fully developed. Tiwai Island would have fully developed to benefit the communities in terms of gate takings, cooperative store, interpretation fees, tour guide fees etc.

Eco-tourism development will depend mostly on the extent of rehabilitation of the roads following the cessation of hostilities and the conservation of biodiversity.

### **3.2. State of Forest Industries**

Most forest industries, (logging and sawmilling companies) had been affected by political interference, nepotism, dominance of foreign investors and poor transparency and accountability.

Logging, sawmilling and furniture production industries with high number of indigenous shareholders are likely to be encouraged in the interest of sustainability. In the absence of an operational forest industry for the past 4 – 5 years, individual powersaw operators, which continue to increase in numbers, have been encouraged to float an indigenous company to ensure the effective realization of benefits by local forest-based communities and ensure reforestation. Sawn timber of standard dimensions, possibly plywood and even pulp production would be possible by 2020. Acacia and Gmelina plantations established now could provide pulpable materials.

Due to difficult working terrains in most of the forests and the relatively high cost of forest road construction in poorly drained areas, mobile sawmills are likely to dominate sawmilling operations. Industries using near-obsolete machinery will have to change to modern machinery in order to stay in profitable business. Export of high-value sawn timber could resume, following its termination in 1990. Pressure will continue to mount on the Forestry Sector for the resumption of round-wood export during the next 2 decades and the sector may allow some limited log export.

Many entrepreneurs would have ventured to import machinery before seeking professional advice. The training of sawmill technicians, saw doctors, saw operators etc will be a necessary pre-requisite to the success of sawmills in future.

Illegal exportation of sawn timber to Liberia and Guinea by boat will continue as long as ill-gotten timber, with minimal production cost, is available and particularly due to the high price differential between sawn timber prices of Sierra Leone and the neighbouring countries. However the sustainability of raw material supply is critical to the future success of the industry.

The rattan cane industry will thrive and possibly reduce the pressure on timber for furniture production.

The carving industry will open up at a rate probably in proportion to tourism development. Wood waste could be utilised for this purpose to the advantage of the sector.

### **3.3. Wood Supply Situation.**

Based on a projected population estimate of 8.9 million in year 2020 and on the basis of per capita consumption of sawn timber, construction poles, firewood and charcoal of 0.07 m<sup>3</sup>, 0.012 m<sup>3</sup>, 0.52 m<sup>3</sup> and 0.11 m<sup>3</sup> respectively. The wood supply and demand situation will probably reflect a deficit.

The total standing volume of timber in all types of forests is 6.6 million m<sup>3</sup> (1990) and the annual increment of the various forest types will result in a yearly volume increase of 495,000 m<sup>3</sup> for all exploitable forests over the 20-year period. The scale of deforestation is not known with any certainty particularly over the past 9 years. White wood supply to remote areas will be relatively easy, cheap and less time-consuming due to close proximity



to raw materials. However, supply to urban areas will be difficult, expensive and time-consuming especially considering the poor state of our provincial routes.

### 3.3.1. Timber, Poles and Fuelwood Supply

Industrial roundwood will be mostly produced in the east and south of the country about 200 miles from the capital, Freetown. Construction poles mostly comprising of *Anisophylea laurina* are currently utilised in the construction of Internally Displaced Person's and Refugee camps. The present stocks are not managed on any sustainable basis as the current rate of depletion by far exceeds the rate of replenishment.

Contracting construction pole (fence sticks) supply directly to local communities encourages the depletion of even the heavily depleted Western Area Peninsula forests which are managed purely for protection purposes and frustrates the efforts of the forestry personnel to discourage such a lucrative business. The NGOs mostly pay twice the normal market price for these poles. A replenishment programme will be ideal and NGOs in shelter construction should be ideally supportive.

Woodlots established by farming communities in the Western Area will supply the Freetown population but the extra large sizes of billets, making splitting and handling difficult, could make it less attractive than the small 30 – 40 mm diameter billets, obtained from forest regrowth. Charcoal production methods currently used encourage a lot of wastage. Proper charcoal production kilns will be introduced in order to make the production method energy-efficient.

### 3.3.2. Alternative Energy Sources

Peat deposits are found in the Ribbi chiefdom and probably in other areas. Peat is a potential source of energy and its contribution to biomass energy could be explored fully.

Coconut shell for fish smoking particularly in the fishing communities of Shenge where coconuts are also grown in abundance could provide alternative biomass energy source.

Energy generation from Sewage holds a lot of potential as exemplified by the Bomeh methane generation project of the Ministry of Health and Sanitation.

Tidal, wind and solar energy are grossly underutilised at the moment. However solar energy tapping through solar panels seems to be on the increase and is likely to be explored intensively in the next 2 decades.

Dependence on imported petroleum is risky because frequent price increases tend to force users of kerosene, electricity and gas stove users to resort to the use of firewood and or charcoal. Fuel price increases over the past decade average about 27% per year although the price of kerosene which is used by 95% of the population has remained constant for the last two price increases in year 2000. Also increases in fuel price in March 97, June 98 and 99 left kerosene at Le 2,000 (see annex 2.4).

In addition increases in the prices of cooking stoves themselves could force consumers to resort to either cheap mud stoves or even the zero cost 3-stones cooking method. The completion of the 305MW Bumbuna Hydro Electric Project by 2003 – 2004 could ensure the generation of relatively cheap electricity. This may reduce the number of consumers reverting to the use of biomass energy on price conditionalities alone.

Also, the 5MW Goma Hydro Electric Project provides cheap and reliable electricity to the Eastern and Southern Provincial headquarters of Kenema and Bo respectively. However, during the dries, when the water levels and power drop, heavy fuel oil is used to generate power; hence the partial (seasonal) dependence.

Generally, the dependence on imported petroleum products will continue to be heavy in the industrial sector.

At the moment, petroleum-powered-electricity generated accounts for only 27% of the total electric energy needs of the capital Freetown.

Plywood, particle board, hardboard etc. are currently imported into the country for building construction, maintenance etc.

In the absence of a functional and reputable timber company, the importation of these commodities will continue, unabated.

Apart from packaging wood, timber import is not a normal practice.

However, cheap packaging wood, provides construction material for the less well to do in society.

Match splint was imported up to 1994/95 when the company closed. The company may resume normal operations following the cessation of hostilities. Furniture importation by returning students, diplomats etc. continues but could be insignificant in terms of volume and cost.

### **3.4. Social and economic contribution of Forestry.**

Sierra Leone has about 24 HEP sites capable of generating electricity. But of those, only the 5 MW Goma supplies hydro power to the provincial capitals of the East and South respectively

When completed, the 305 MW, H.E.P. will produce surplus energy for exportation to neighbouring countries with substantial foreign exchange earnings.

In addition, the Guma Valley Water Company and the Intrapex Water Company spend about Le 70 million and Le 10 million on staff and labour welfare per month respectively.

The now defunct Forest Industries Corporation; Panguma sawmills; Sierra Wood Ltd; and the Sierra Leone Timber and Plantation Company (SILETI), employed over 4,000 workers (skilled and unskilled) and constructed and maintained over 600 miles of road in rural settings in Eastern Sierra Leone during 80's and 90's.

About 80% of the population is rural based consuming 6.2 million m<sup>3</sup> of firewood; 396,000 m<sup>3</sup> wood equivalent of charcoal; 43,200 m<sup>3</sup> of fence sticks and 252,000 m<sup>3</sup> of timber for construction, cooking, heating etc per year.

The crucial role of forests in food security in Sierra Leone lies in the fact that most of the so-called hungry season foods are available and affordable mostly during the rains, when roads are impassable, thereby cutting off imported food supply from the urban centres.

In addition, rural children obtain most of their vitamin C supplies from the plum of *Spondias mombin*, *Anisophyllea laurina*, *Cola lateritia* and *Parinari excelsa*. Also, a common source of protein during the dry season, is from the roasted seeds of *Pentaclethra macrophylla* and *Bussea accidentalis*.

In Western Sierra Leone, for instance, over 70 plants species have been identified for plant medicine and dyes in the Western Area peninsula forests alone.

The cabbage of the young palm tree, bush yams (*Discorea*) etc are important hungry season foods in rural Sierra Leone.

The forestry sector provides employment for joinery and carpentry shops; pole, and firewood sales, sale of snack foods, medicinal herbs, rattan cane furniture production and sale etc.

The construction of extraction roads, trunk roads and their maintenance “opens up” areas which were hitherto closed to development. Such rural roads enhance agricultural development; ensure the delivery of health services to remote communities and improve the economy of rural communities due to the influx of employees of logging and sawmilling companies.

In addition, forests and related industries employ at rural level substantially thereby curbing rural/urban migration.

### **3.5. Forestry and the Environment**

#### **3.5.1. Conservation and Biodiversity.**

Most biodiversity hotspots in Sierra Leone are contained in the following protected areas: forest reserves; community forests, national parks; game sanctuaries and other proposed protection areas.

In addition, certain protected areas have been designated as important bird areas (IBAs) which protection and conservation is covered by the Global Environmental Facility-funded, “African-NGO partnership for sustainable biodiversity conservation project” (see annex 3.1). In addition, the 741 km<sup>2</sup> Gola Forest complex had been managed under the support of the Royal Society for the Protection of Birds (RSPB) since May 1990. The adjacent 12 Km<sup>2</sup> Tiwai island which forms a buffer zone to Gola West had been supported by the New York Zoology Society; the City University of New York and the Miami University, since the early 80’s.

Forest biodiversity could be better conserved depending on the cooperation of the local forest-dependent communities; funding support for monitoring; community sensitisation; controlled harvesting and the much needed political will.

In addition, forest patches and sacred groves on communal lands, if protected in collaboration with the communities, could ensure biodiversity conservation. Secret society bushes which were well protected before the onset of the rebel war, could now host some substantial plant and animal biodiversity due to the reduced deforestation around abandoned settlements.

### 3.5.2. Protective Role of Forests

Sierra Leone's 24 potential HEP sites currently benefit from forest cover but even these high altitude vegetations are threatened by shifting cultivation and wild fires. However, a management plan has been proposed for the 305 MW Bumbuna catchment while the 5MW output Goma HEP is currently being protected. In addition, the Sugar Loaf catchment of the Freetown Waterworks Forests Reserve, is fairly well protected and supplies water to the Guma, Babadori and Congo dams which supply Freetown, the nations capital. Most catchments are fully or part of forest estates. The Guma Valley Water Company proposed World Bank-funded "water yield enhancement project" should include forest protection and regeneration efforts if the water yield should cope with the expanding population. The cooperation of Guma management is crucial to the catchment protection aspect of the project.

The Catholic Relief Services sponsored project "Restoring the Lion Mountains" if sustained, could restore forest vegetation on the vulnerable hilltops overhanging Freetown. Similar interactions should be replicated along the Wara Wara mountains of Kabala and the Wusum Hills of Makeni, (both in the North); Moyamba Hills (Moyamba Forest Reserve) in the south; the Kambui Hills in the East etc.

### 3.5.3. Plantation establishment and tree planting

Carbon sequestration could be significant from plantation forests which may be better managed than natural forests which are currently seriously threatened by powersaw operations; agricultural expansion; mining etc. Tree planting by communities in particular and the retention of forest vegetation at critical sites could decelerate land degradation and slow down desertification. In the absence of substantial interventions and effective collaboration, the forest cover, in the next two decades will be by far less than the present cover, resulting in an accelerated soil degradation.

## 3.6. Institutional Framework

### 3.6.1. Structure and Function of Forestry Division

Forestry Division comprises of Forest Conservation, Wildlife Conservation and Rubber Development Branch (now privatised). Functional Units comprise of Forest Research, Tree Diseases, Training –all fully functional up to 1985 but now virtually defunct due to poor funding and the lack of staff.

Regional Forest Officers (RFOs) implement government forest policy at regional level. They are assisted by ARFO, Foresters, Supervisors, Rangers, Forest Guards and Work Service Employees.

The mandate of the Division entails the provision of forests products and services thereto for present and future generations in perpetuity.

This is achieved through forest reservation, forest protection, seedling production, tree planting and maintenance, regulation of harvests, public education and sensitisation on deforestation, reforestation, energy and soil conservation etc. The Wildlife Conservation Branch is grossly understaffed and the present core of staff need basic training in Forest and Wildlife Management to be effective.

### 3.6.2. New Roles for the Private Sector and Local Communities

The private sector should be seen to be more functional in the following areas:

- Investment in non-wood forest products such as rattan and bamboo furniture and household utensils production, honey production, rubber establishment and processing etc.
- Communities to be involved in the management of forests outside government controlled forest estates; communities to take up seedling production and tree planting contracts after successful training programmes. They should fully participate in fire prevention and fire fighting (fire management) wildlife conservation, management of wetlands etc.
- Production of transmission poles from the overgrown 70 ha Bradford pine plantation. This holds immense investment potential for rural electrification.
- Carving industry to be developed to support the tourist industry utilizing logging and sawmill waste.
- Revamp the forest production and utilization unit to facilitate revenue generation and the utilization of forest blocks not readily accepted by concessionaires.

### 3.6.3. New Arrangements in Forest Education and Research

- Certificate Training in Agriculture (CTC) curriculum to be developed to support the tourist industry development as well.
- Environmental Science courses tenable at the Njala University College to put more emphasis on theoretical forestry in addition to the attachment programmes over the past 2 academic years.
- Sensitisation and public education programmes to continue over TV/Radio, particularly on provincial radios.
- Cine-vans to be introduced at regional levels since their impacts are relatively easier to evaluate than the radio sensitisation programmes.
- Socio-economic research into the full participation of communities in forest protection and plantation establishment will be essential.
- Research into the sustainable use of lesser-known timber tree species for national and rural development should be conducted. This could increase the number of species to be utilised thereby increasing the value of the forests.
- The utilization of white wood should be encouraged as far as possible to save the nearly over-depleted red wood stock which is currently overdepleted.

## 4. CHANGE FACILITATION

### 4.1. Crucial factors for improvement

In order to cope with the numerous challenges involved in developing the Forestry sector to year 2020, the following critical factors, amongst others, need to be sincerely addressed:

- Capacity Building and empowerment of the Forestry Division; Farmers Associations; Community organizations; Environmentally oriented NGOs and stakeholder line ministries.
- Community forestry development to ensure the sustainable joint management of communal forests, which form the bulk of productive forests particularly for medicines, snack foods and other non wood forest products.
- Encouraging the floating of indigenous and reputable logging and sawmilling companies to ensure the judicious management of the nation's meager forest resources and to also absorb or put the notorious individual powersaw operators out of business due to their relatively high production costs.

- Rehabilitation of Kasewe Sawmill and the establishment of three other mobile sawmills (one sawmill per province) aimed at enhancing the production segment of the sector, in order to generate revenue for the cleaning of forest boundaries, replanting programmes, etc.
- Collaboration with and the involvement of all stakeholder institutions in resource protection and management in order to make management more effective. Structures such as the Landuse Committee, should be replicated nationwide in order to promote sustainable resource management in all seven agricultural regions of the country.
- Semi- autonomy or full autonomy of the Forestry Sector leading to the attainment of a Commission status will do justice to this sector, which is in custody of tremendous resources, but with insignificant support from government. An autonomous status could mean better remuneration for staff; realistic logistical support for operations and above all the capacity to expand in time with increasing responsibilities.

## 4.2. Necessary changes within and outside the Sector

Policy and institutional changes addressing the crucial areas highlighted in (a- f) above should be effected to put all stakeholders in the right gear for developing the sector and other allied sectors.

Stakeholder workshops highlighting the potentials of non-wood forest products (NWFP) targeting the following specific areas of investment will be held in collaboration with Sierra Leone Export Development and Investment Cooperation (SLEDIC) and appropriate institutions:

- Commercial mushroom production for local consumption and possibly for export.
- Commercial production of highly productive animals such as the cane rats for supplying hotels and restaurants and possibly for future export.
- The potentials of the carving industry in promoting the tourist industry and in minimising wood waste from the logging industry.
- The potential of the rattan furniture industry and its possible contribution to the conservation of the mahoganies currently targeted by individual power saw operators
- The establishment of *Funtumia africana* plantations to provide raw material for the match industry and also for the tourist industry in the provision of carving materials.
- The establishment of *Anisophyllea laurina* and other suitable pole species to supply scaffolding, ladder and fencing material for building construction

## 4.3. Appropriate technological changes

### 4.3.1. Enhancing Log Recovery

In order to improve upon log recovery, the current obsolete sawmilling equipment need to be replaced by more efficient and modern machines to ensure a log recovery of 55 – 60 % compared to the current pre-war recovery of 45%.

For logging in hilly and difficult working terrains, mobile sawmills will be recommended. This will avoid all the ills of road construction in forests located at high attitudes, thereby conserving biodiversity and the edaphic environment.

### 4.3.2. Enhancing Watering of Nursery Seedlings

In the drier northern and central districts, the use of water pumps for watering nursery tree seedlings, will be introduced particularly for the many mobile nurseries that will be required for the “Herculean” tree planting programmes awaiting the sector.

#### 4.3.3. Fertilizer application to boost up nursery productivity

Forest tree seedling production had not involved the application of appropriate doses of fertilizer to boost up seedling growth, in the past. However, the large quantity of timely seedling production envisaged, could necessitate the application of fertilizer to nursery seedlings.

#### 4.3.4. Wood Stove Programme Dissemination

In view of the gross inefficiency of the traditional 3-stones cooking method (8% efficient), the introduction of 40% energy – efficient mud stoves could reduce the actual demand on firewood for purely cooking and boiling purposes. These stoves will be promoted in the drier northern and central districts. Their virtually zero production cost and their ease of production and maintenance by trainees could further enhance their dissemination and adoption process.

#### 4.3.5. Plantation establishment by the “ Taungya “ method.

Land clearing costs normally take a big chunk of plantation establishment costs but where farmers are willing to clear for the usual upland rice cultivation and allow the planting of forest tree seedlings at ploughing time, the final plantation establishment and initial maintenance costs could be reduced drastically. This opportunity will be explored as much as possible particularly on communal land.

#### 4.3.6. Introduction of energy-efficient charcoal kilms.

Traditional charcoal production methods encourage a lot of wastage and could be more time consuming. Efficient aluminium charcoal kilms could reduce wood waste and possibly maximise profit.

### **4.4. Feasibility of the Changes**

The feasibility of the perceived changes will generally depend on the total involvement and cooperation of all major stakeholders who should be consulted at every stage in the planning and development process.

The willingness of the community heads to jointly manage communal forests with the Forestry sector is crucial to the forest expansion process. The realization of short-term and tangible benefits particularly through the development of the NWFP segment could enhance peoples’ involvement and eventual participation.

An upward review of fees and royalties and the general maximization of tangible benefit to forest-dependent communities, could further enhance their perception and valuation of forests which are currently undervalued.

### **4.5. Role of Various Stakeholders.**

Government should take the lead in sincerely and effectively involving all stakeholders in the process. Development projects should be needs driven before the land-owner communities could appreciate any impacts of such projects on their communities.

Private sector involvement in particularly the development of NWFPs will fuel development in other segments and enhance community involvement. NGOs should continue to augment

government efforts through advocacy, public sensitisation, logistical support and dialogue with donors and other partners in development.

Civil society support as far as it influences grassroot organizations, local communities to get fully involved, is essential.

## 5. CONCLUSIONS

The forecast of forests products and services to be utilised and the balancing of this demand with supply will be affected by data scarcity; uncertainties surrounding the end of the war; war related movement of people; war related damage to forest crop; migration trends; the need for the construction of 300,000 housing units; the speed of resettlement of traditional rulers; the speed of reconstitution of the defunct district councils; the economic performance of the country etc.

The grossly marginalized and underfunded forestry sector can serve the nation better if it is autonomous enough to improve staff remuneration and welfare on the basis of productivity and enhanced job environment. Necessary increases in staff strength could make the sector more responsive to the needs of the nation.

The role of tradition in conservation and the involvement of all stakeholders in the planning and execution of forest management will be crucial to both the planning and execution process. The role of women in seedling production and forest conservation should be enhanced including the recruitment of female forestry extension agents to change the face of extension agents.

Donor involvement in and support to the process is crucial to the realization of set objectives.

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