Forestry Outlook Study for Africa (FOSA)

Ghana

Ministry of Lands and Forestry
2nd Draft

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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.
Summary

MICRO-ENVIRONMENTAL FORCES

Forest management
There has been inefficient allocation of forest concessions in the past. The annual allowable cut (AAC) has been exceeded for almost a decade. High commercial timber lobby used to influence the operations of the state. On average, the AAC has been exceeded by more than 46% during the period 1990-1998. There is inefficient marketing of forest products; unrealistic pricing of forest products and administrative procedures had no links to market realities. There are problems with bush-fires especially in the transition forest zones and the highly degraded forest areas. There is no reliable database for proper forest management planning.

Inadequate control of the exploitation of the forest concessions has resulted in about half of forest reserves being categorised as mostly degraded or in worse conditions. This has predisposed such areas to forest fires that is exacerbated by drought. It has been assessed that about 30% of the forest areas are destroyed by fire each year and only about 20% of the forest zone is currently covered by forest that has not burnt regularly. The regeneration of the forest as well as the services that it provides are thereby adversely affected. There is a general increase in forest disturbance from wetter to drier forest zones.

Weak forest policy and implementation
The 1989 Investment Code encouraged over-investment in the milling sub-sector through fiscal incentives. This has contributed to the over-capacity in the industry that in turn has encouraged over-exploitation of the timber resources.

There are no mechanisms for coordinating the activities of the sectors involved in agriculture, mining, infrastructure development and population. There is also lack of unity in the private sector trade associations. Their co-operation with the forest sector agencies in the implementation of sound forest management practices has not been as expected.

The farmers are generally not adequately compensated for the damages caused by timber exploitation. In these circumstances, they would prefer to either destroy the trees or connive with the chainsaw operators to process them on the farm if they are assured of a much more equitable share of the proceeds that will ensue from the operation. The landowners did not consider that forest reservation was a paying concern and hence did not invest resources in forest protection and management. The royalties from the exploitation of the forests were also poorly collected and inequitably distributed. The result has been the mining of the forest resource as the responsible government agency has also not been adequately equipped and motivated to execute its mandate. Government institutions are very recent converts to the community forestry scene.
The timber lobby that has kept the royalty levels particularly low by expedient politicking. Revenues collected from the forest concessions do not cover the full cost of forest management. This has encouraged over-exploitation of the highly desirable species.

Private participation and private/public funding in forestry is low.

**Forest industry**

There is over-capacity in the wood industry. The raw material prices are not related to the market trends. The recovery rates of log inputs are generally low (20-40%). The wood industry has traditionally concentrated on exports, to the neglect of the local market. The total volume of sawmill lumber available for domestic use is only 152,660 m$^3$ per year while the domestic demand for lumber is about 384,730 m$^3$. This means that the difference of 232,070 m$^3$ has to be supplied from other sources. Supplies to the local market (estimated at a demand of 0.7 million m$^3$ per year) are supplemented by illegal logging and chainsaw operations.

**MACRO-ENVIRONMENTAL FORCES**

**Land & tree tenure**

Members of a landholding group have usufruct rights that are equivalent to freehold. Such land for most practical purposes belongs to the member and his interests are secure, inheritable and generally alienable. Tenant farmers do not own the trees found or even planted on their land except for planted economic trees in the Upper West Region. Tenant farmers may however be allowed to harvest trees for their own use, but not for commercial purposes. Individuals cannot harvest economic trees on unallocated communal land even if they have planted them. In traditional land agreements, when the tenant changes the land use, which was agreed upon during the land acquisition, the landowner’s consent must be sought.

**Energy**

It is estimated that 14 million m$^3$ of wood are consumed for energy. The projection of the consumption of fuelwood for the year 2010 is 20 million m$^3$. About 69% of all urban households in Ghana use charcoal. The annual per capita consumption is around 180 kg. The total annual consumption is about 700,000 tones, 30% of which is consumed in the capital, Accra. Charcoal production is concentrated in the transition zones between the forest and the Savannah woodlands.

91% of total roundwood production is used as fuelwood and for charcoal. The remaining (9%) is used as industrial roundwood (mainly timber).

**Deforestation**

Under the medium term road infrastructure programme, Ghana intends to develop and reconstruct 1,188 km of road between 2000 and 2002 through donor assistance while about 835 km would be constructed with its own funds in the same period. There may be more by the year 2020. Most of road construction works will be directed towards the forest reserves. This, coupled with opening up of the forests to accelerated encroachment and consequent clearance will have adverse effect on the forest resource base. Urban development can also bring inroads into the forest areas. In 1976 it has been estimated that by 1990 a unit increase in the urban population would require an additional land area of about 33 ha for the provision of additional housing, infrastructure and other social services.

Agriculture is the dominant land use. It is based mainly on the shifting cultivation technique or an extensive system of farming. It has been estimated in 1987 that about 70% of
Deforestation in the country can be attributed to this method of farming. In general, the size of agricultural lands increases every two years by 9%, which indicates the threats of agriculture on forestry development.

Open cast mining poses a threat to the integrity of the forests. There are also several of illegal small-scale mining activities in the closed forest areas. Some of the forest reserves that may be affected are in and near the genetic "hotspots" of the wet evergreen forest zone.

**Economic factors**

While there has been an increase in GDP of 52% from 1984 to 1993, most people’s per annum income is still below the 1975 level. More than one-third of Ghanaians live below the poverty line. The poor and landless peasant farmers tend to be pushed onto ecologically sensitive areas with low agricultural potential such as semi-arid savannah, erosion-prone hill sides and forests areas.

**Demographic factors**

High population growth and fertility rates coupled with high maternal and child mortality. The March 2000 census gives a provisional population estimate as 18.9 million indicating an annual growth rate of 3.0%. The average population density is 71 persons/km², its distribution is very uneven. There are high densities in Greater Accra, Central and Eastern regions in the south with low densities in the savannah region except in the Upper East Region.

About 0.4% of the settlements are classified as urban where about 30% of the population live. The five largest cities account for about 50% of the urban population. This places pressure on infrastructure and services in the urban areas.

Internal migrations, especially from the transitional zone of Brong Ahafo region to the forest areas of Western and Ashanti regions for cash crop cultivation also account for the high rate of forest degradation in those areas.

Some of the uncertainties for the future of the sector that were identified include:

- The political will to support major forest policies;
- The participation of the communities in forest management;
- Continued support of the donor communities for forestry projects;
- The implementation of effective forest revenue systems so as to be able to cover the cost of forest management;
- Skilled labour, adequacy of raw materials and marketing expertise for the promotion of value addition in the sector;
- The acceptability of the lesser used species by the export market;
- The effect of certification on forest management, and
- The effectiveness of the on-going reforms in forestry institutions.

**SCENARIO DEVELOPMENT**

Two scenarios are presented:

**Scenario 1** (Muddling through Development): This is appears to be a trend scenario that assumes that the current driving forces will continue in the same manner or even negatively in some cases and that there would be modest or no change in the growth of the economy by the year 2020.

**Scenario 2** (Sustainable Ghana): The scenario envisages self-sufficiency in the services and goods that the forest provides while the integrity of the forest is maintained. How this can take place (i.e. how conservation can be achieved side by side with production) is not made
explicit, but this vision has been chosen as the best. This is contrary to the accepted use of scenarios in assisting the choice of a strategy instead of the confirmation of one.

Even though inter-sector cooperation has been indicated as one of the most important issues in forestry development, the two scenarios did not treat this aspect adequately. Recommendations for the future have been made. These appear to be related to the amelioration of the weaknesses that have been identified with respect to the current situation mainly within the forestry sector.

1. INTRODUCTION & STATUS OF THE FORESTRY SECTOR IN GHANA

1.1 GENERAL OUTLINE OF GHANA

1.1.1 Location

The Republic of Ghana is located on the West Coast of Africa, situated between latitudes 4° and 11.5° north of the equator. It has a total land area of 23.85 million ha and is bordered by Togo on the east, La Côte D’Ivoire on the west, Burkina Faso on the north and the Atlantic Ocean on the south.

1.1.2 Climate

Ghana is characterized by a tropical climate but the annual rainfall level decreases as the altitude increases to the north, where a savannah climate becomes dominant. Most part of the country belongs to the Tropical Savannas Climate and the Sub-Saharan African moist region. The annual mean temperature ranges from 25°C to 27°C and is fairly constant throughout the year. The annual rainfall is as high as 2,000 mm in the southwestern part of the country but decreases towards the northeast, dropping to 1,000 mm at the northern border area.

1.1.3 Vegetation Cover

The natural vegetation cover over the vast areas of Ghana is closely related to the mean annual rainfall. The major vegetation formations are the closed forest, northern savannah, coastal savannah and the coastal strand and mangrove formation. The country is roughly divided into the High Forest zone in the south, accounting for a third of the land area and the Savannah Zone in the north, accounting for the remaining two-thirds. The closed forest zone contains high value redwoods and other species of commercial importance.

1.1.4 Land Use Categories

The traditional land uses in Ghana are small and large scale farming, forestry, wood fuel, cattle grazing, urbanization, tree plantations of exotic and indigenous species (cocoa, rubber, timber), and game/park reserves.

Within the high forest zone, 1.76 million ha (21% of High Forest Zone) are permanently protected. Occupancy and agriculture are not permitted within the reserves, however, certain lands within the reserve, were alienated as admitted farms at the time of gazetting the reserves. Additionally, agriculture is practiced within reserves as a component of the Taungya system of plantation established under departmental control and supervision. About 126,600 ha in Forest Reserves are under the jurisdiction of the Wildlife Division as Protected Areas.
Outside the permanently protected forest estates, there is very little intact forest remaining and much of this is confined to sacred groves and other culturally significant areas. Timber exploitations take place within timber contract areas, which cover both on and off Forest Reserves. Off reserved timber trees mostly stand on farmlands and fallow areas.

1.1.5 Importance of Forestry

Agriculture, including forestry, is the backbone of the Ghanaian economy. It provides 43% of the Gross Domestic Product, 50% of export earnings and 70% of total employment. Forestry as a sub-sector accounts for 6% of the GDP, 11% of export earnings and employs a labor force of 100,000 people.

Most of the rural population depends on the forests for their survival as forestry has played a significant role in the provision of food, clothing, shelter, furniture, potable water supply sources and bushmeat, thus providing livelihood for over 2.5 million people. The forests are also highly valued as sources of natural medicines, which are essential components of health treatment, which is commonly used in conjunction with mystical and ritual practices.

The timber industry is the third most important foreign exchange earner of the country. It is one of the fastest growing manufacturing units in the country and generates more employment and income to a majority of Ghanaians.

1.2. FOREST & FORESTRY

1.2.1 Forest Resources

The forest area of Ghana is estimated at 9.17 million ha accounting for about 40% of the total national land. The classification of these forests, based on ecological conditions, puts the Closed Forest Zone area at 8.1342 million ha, 1.036 million Transitional Forests and the Savanna Forest Zone at 14.66 million ha, giving the total area 23.85 million ha. The Closed Forest Zone is categorized into Evergreen Rainforest, Evergreen Moist Forest and Moist Semi-deciduous Forest.

1.2.2 Forest Conditions Today

In 1992, it was estimated that only about 1.5 million ha of "intact1 closed forest" were remaining in Ghana. The annual rate of deforestation was said to have slowed in the 1980s to about 22,000 ha (FAO, 1988, & IUCN, 1992). The current annual rate of deforestation is not known but it is estimated to be lower than what it used to be two decades ago.

.Status of Forest Reserves:

According to a study conducted by Hawthorne and Juam (1993), about half of Ghana’s reserved forests, (about 9,000 km2) are in a condition described as reasonable. The rest are either mostly degraded or in worse conditions.

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1 Intact forest in this study is defined as forests with greater than 40% canopy closure. (IUCN, 1992).
The state of the forest reserves indicates that there is a general increase in forest disturbance from the wetter to the drier forest areas. About 14% of the total permanent forest estates in Ghana are without adequate forest cover. The worse affected areas are the Moist Semi-deciduous North-west and South-east subtype Forest Zones. These are the results of both forest fires and logging damage. It is clear, however, that while reserve boundaries have been largely protected and respected, the condition of the reserves within are variable and in many cases deteriorating.

### Conditions of Off-Reserved and Farm Forest Resources:

Data on the conditions and the extent of coverage of the intact closed canopy forests outside the Forest Reserves are rather scanty and ambiguous. Nsenkyire (1992) estimated intact closed canopy outside the reserves at about 3,740 km² whilst the World Bank (1987) estimated it to be 2,700 km². The IUCN estimated it as 1,000 km². Hawthorne (1990) and Norton (1991) (cited in Abu Juam, 1993) estimated that closed canopy forest outside resources may comprise as little as a fifth of IUCN estimate; much of it in small, scattered patches e.g. swamps and sacred groves.

### Sacred Groves:

In the southern part of the country, small areas of intact or slightly degraded forest can be found that have been reserved due to religious and traditional beliefs. These sacred groves, as they are called, have various underlying beliefs and prohibitions, but the common denominator is that cutting of trees for timber is prohibited. These groves add considerable value to the protected area of forests of high genetic value, which are poorly represented in state-managed Forest Reserves.

### 1.2.3 Forest Resources & Production Potential

The area of intact tropical high forest in Ghana has been estimated to be approximately 1.6 million ha. The various categories of production areas are summarized in Table 1.

<table>
<thead>
<tr>
<th>Forest type</th>
<th>Area (ha)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber Production Area</td>
<td>762,400</td>
<td>47</td>
</tr>
<tr>
<td>Permanent Protection</td>
<td>352,500</td>
<td>22</td>
</tr>
<tr>
<td>Convalescence</td>
<td>122,000</td>
<td>7</td>
</tr>
<tr>
<td>Conversion</td>
<td>127,200</td>
<td>8</td>
</tr>
<tr>
<td>Not inventoried (conversion)</td>
<td>270,000</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total Reserve Area</strong></td>
<td>1,634,100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Forest Service Division, 1995

The permanent protection areas consist largely of hill sanctuaries, swamp sanctuaries, shelterbelts, special biological protection areas, intact forest sanctuaries and fire protection areas. According to the inventory reports (March, 1995) only 15% of the area, which is protected on grounds of genetic diversity, is well stocked and accessible. The rest of the areas are either inaccessible or degraded.

The convalescence areas are those with reduced stocking, but which are considered capable of rehabilitation within one felling cycle. Conversion areas require planting. The production timber areas are forestlands where present production is extracted using the interim yield
formula. It has also been estimated that intact closed canopy forest outside the permanent forest estate, available for timber production is about 374,000 ha. Plantation forests cover about 50,000 ha.

- **Standing Volume:**

Report of recent inventory carried out by the Forest Services Division indicates that out of 300 species inventoried, 60 species could be classified as of commercial interest (based on current demand). The gross national standing volume (All species class) is estimated at 188 million m$^3$.

- **Annual Allowable Cut-Cross:**

The Forest Services Division in 1990 estimated that the Annual Allowable Cut (AAC) for already exported species was 1.2 m$^3$/ha/year. This brought the AAC at 1.2 million m$^3$. However, by 1995 it had been found that this production rate was not sustainable since most of the forests were progressively depleted in stocks of some major species. The annual yield for species groups was therefore calculated as follows:

<table>
<thead>
<tr>
<th>Species Group</th>
<th>Stems</th>
<th>Volume (m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scarlet</td>
<td>5,460</td>
<td>115,900</td>
</tr>
<tr>
<td>Red</td>
<td>15,300</td>
<td>208,700</td>
</tr>
<tr>
<td>Promotable Pink</td>
<td>38,660</td>
<td>358,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>59,420</td>
<td><strong>683,100</strong></td>
</tr>
</tbody>
</table>

Source: Forest Services Division FIMP (1995)

- **Scarlet** species are under imminent threat of economic extinction
- **Red** species are those for which current rates of exploitation present a significant danger of economic extinction
- **Pink** species are significantly exploited, but not yet so as to cause concern for their economic future
- **Promotable pink** species are those suitable for increased exploitation on grounds of their ecological abundance and economic potential

A sustainable level of production from the reserves of the 32 Scarlet and Red species currently favoured by the industry and the export market would be no more than 0.32 million m$^3$ per year. The commercial utilization of Promotable Pink species is estimated to be 0.36 million m$^3$. Thus the total “on-reserve” harvest is estimated as 0.68 million m$^3$ per year as indicated in the table. However, based on sustained yield basis the total net AAC for Ghana for the species that the past 15 years have been exported, considering only the volumes above limit diameter available and a 63-year rotation period is about 1.0 million m$^3$. This is made up of 0.50 million m$^3$ from reserved forests and 0.5 million m$^3$ per year for off-reserves.

It could be inferred from the foregoing that the 762,400 ha of reserved forests suitable for timber exploitation can only generate 683,100 m$^3$ of logs.

1.2.4 Present Production & Stocks

Timber production in Ghana is derived from the high forest and the volume of harvesting over the years has not been within sustainable levels. Statistics from the Forest Services Division indicate that, the level of harvesting over the last 10 years has been
exceeding the AAC, indicating that the forest capacity has been surpassed for almost a
decade. On the average more than 46% capacity of the forest has been exceeded during the
period.

- **Log Production:**

  The timber industry presently turns out a host of wood products for both domestic
  consumption and for export. Over the years there has been expansion in scope of wood
  products for exports while the domestic market has also shown considerable increase in wood
  products utilization. Log production, export and consumption increased tremendously up to
  1994 when it dropped. Log exports also increased steadily until 1995 when a temporary ban
  was placed on the export of round logs. The ban has placed more logs on the domestic market.
  The domestic consumers of log are the primary and secondary processing mills such as
  sawmills, plywood and veneer mills.

- **Fuel Wood Consumption:**

  It is reliably estimated that 14 million m$^3$ of wood are consumed for energy production.
  It has also been estimated that the volume of fuel wood consumption in Ghana could rise to 20
  million m$^3$ by the year 2010. About 69% of all urban households in Ghana use charcoal for
  cooking and heating and the annual per capita consumption is around 180 kg. The total annual
  consumption is about 700,000 tons, 30% of which is consumed in the capital, Accra.

  Charcoal production is concentrated in the transition zones between the forest and the savanna
  woodlands. Most of the wood comes from savanna trees, which are felled for this purpose,
  and also from logging residues. It is being estimated that of the total round wood production
  in Ghana, 91% is used as fuel wood and for charcoal. The remaining (9%) is used as industrial
  round wood.

1.2.5 Production, Export & Consumption of Sawn timber

Saw milling has recorded a rising trend in production just as the export and domestic
consumption of sawn timber, particularly during the post-Economic Recovery Program era of
1983. The total sawn timber production has been increasing from 472,000 m$^3$ in 1990 to
740,000 m$^3$ in 1997. Local consumption of sawn timber has increased from a level of 270,000
m$^3$ in 1990 to 461,000 m$^3$ in 1997.

- **Production, Export and Consumption of Veneers:**

  The production, export and local consumption of veneers (comprising sliced, rotary, jointed
  and reconstituted veneers) have all shown increasing trends. According to the Timber Export
  Development Division, total production of wood-based panel products such as profile boards,
  chipboards/particleboards, blackboards, etc has increased from an average of about 50,000 m$^3$
  in 1983 to 70,000 m$^3$ in 1994. The estimates put export over 30% of annual production.

- **Export Performance of Wood Products:**

  From a low level of about 102,000 m$^3$ in 1982, exports of timber products climbed to about
  428,000 m$^3$ in 1991 and to over 0.9 million m$^3$ in a peak performance in 1994. This has since

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2 The unofficial figures were estimated.
3 Study of Production and Marketing of Woodfuel in Selected Centres in Ghana, by Nketia and Hagan, 2000
dropped to about 365,000 m³ by the end of 1996. Correspondingly, values also shot up from DM 173.0 million in 1991, rising gradually to a record height of DM 354.2 million in 1995 and DM 222 million in 1996.

1.2.6 Milling Capacity in the Timber Industry

The timber industry is characterized by an over-capacity of out-dated and inefficient equipment, rated at an intake of some 2 million m³ per year. There is evidence that this over-capacity is increasing, due largely to new investments wanting to take advantage of the relatively cheap raw material and existing loopholes in investment incentives provisions. At the same time, some of the larger companies have invested in down-stream processing and are successfully finding markets for lesser-known Pink-species that have been converted to finished products. More recently, kiln-drying capacity for lumber seasoning has increased substantially in response to the new export levy on air-dried lumber. This positive trend sets the stage for growth in further value-added production and marketing.

The industry has traditionally concentrated on exports, to the neglect of the local market. The output of processed products increased significantly. At the same time, supplies to the local market (estimated at a demand of 0.7 million m³ per year) were supplemented by illegal logging and chainsaw operations. The domestic demand is likely to rise or to keep pace with the expanding building construction industry and the growth of the economy (currently 3.8%, targeted at 5% per year).

1.2.7 Wood Export Markets

The European countries notably Germany, United Kingdom, France, Italy and the Netherlands are the major export markets for Ghana’s wood products accounting for about 70% by volume and value respectively of total timber exports in 1998.

Government’s policy on the marketing of timber and wood products has been to lessen the country’s dependence on the traditional market of Europe and diversify the timber export markets. It can be said that this policy of market diversification is yielding results, particularly in opening up the Middle East, the Far East and the U.S.A..

1.2.8 End-Uses of Domestic Lumber

The domestic lumber is used by the following category of trades:
- Small scale furniture manufacturing companies
- Truck body builders/boat builders
- Pallets and Crate Users
- Construction Companies (housing developers)
- Overland wood product exporters
- Wood Carvers
- Railway Corporations

- **Furniture Manufacturers:**

There are a total of 41,141 small-scale carpenters registered with the Association of Small Scale Carpenters. The small-scale carpenters represent the largest group of end-users. They require 219,000 m³ of sawn timber annually. This represents about 72% of the total domestic
timber requirement for the entire country.

- **Construction/Structural End-Use:**

These categories of users are estate developers. It has been estimated that this category of users require 104,000 m$^3$ of sawn timber for constructional and structural use annually. About 50% of these demands are used in the Greater Accra region while 28% is required for the Ashanti region. A study by the TEDD indicated that construction companies obtained their supplies from chainsaw operators. Less than 5% are obtained from sawmill supplies, with the remaining part being obtained from chainsaw products, which are cheaper.

- **Transport Palets, Crates:**

About 12,370 m$^3$ of lumber is estimated to be the requirements of the transport sector (including railways) annually. These products are mostly obtained from sawmills since chainsaw operators are unable to cut to specifications.

1.2.9 Lumber Production & Distribution

The Ghanaian wood industry is export-oriented and most of the mills have very low recovery rates. The lumber recovery factor is 20-40% of the log input. The total log requirement of the sawmills in the country is about 1.32 million m$^3$. This figure excludes the volume of logs for other primary wood processing activities like veneer and ply milling. The volume of log requirement in the regions for domestic use far exceeds the AAC of 1.0 million m$^3$. Since investors have already sunk money to establish their mills they use all possible means to get logs to feed their mills, hence the continuous illegal harvesting of trees.

The total volume of sawmill lumber available for domestic use is only 152,660 m$^3$ per year, yet the demand of the domestic end-users is about 384,730 m$^3$. This means that the difference of 230,070 m$^3$ has to be supplied from other sources.

1.3 OUTLOOK OF FOREST POLICIES

1.3.1 Forest Policy Goals and Objectives

Ghana’s Forests Policy has gone from encouraging the rapid exploitation of the forest for timber during the immediate post-independence period, to forest conservation through increasing domestic value-added in the processing of wood products. The 1994 Forest and Wildlife Policy provides a framework for forest resource use and administration, which reflects the realities and aspirations of Ghana today. It defines the principles and objectives of forest resource management and the strategies for achieving those objectives.

The Policy was formulated at a time when Ghana was just ending a long period of military rule and entering a new period of constitutional democracy. The 1992 Constitution laid down a series of Directive Principles of State Policy to guide all citizens, Parliament and any other bodies taking and implementing policy decisions. These included: a democratic political system, social justice, participation in development processes, a system of decentralized local government and national economic development, a major base role for the private sector and a redress of the imbalance between the rural and urban areas. The Constitution also required the Government to prepare a 25 year National Development
Policy Framework that became known as Ghana-Vision 2020. This framework recognizes that while there has been an increase in GDP of 52% from 1984 to 1993, most people’s per annum income is still below the 1975 level. More than one-third of Ghanaians live below the poverty line. The vision for Ghana is to become a middle-income country by the year 2020.

The new Forest and Wildlife Policy reflects the development aspirations of Ghana today as defined by the Constitution and Vision 2020 and its responsibilities towards the international community. The overall aim of the Policy is the: “Conservation and sustainable development of the nation’s forest and wildlife resources for the maintenance of environmental quality and perpetual flow of benefits to all segments of society.” The objectives of forest resource management on and off reserve are also stated. These objectives provide a clear statement of what is regarded as a legitimate interest in the resource.

1.3.2 Legitimate Interests and Rational Roles

The Forest and Wildlife Policy states that the objective of managing the permanent forest estate is to: “Manage and enhance Ghana’s permanent estate of forest and wildlife resources, for preservation of vital soil and water resources, conservation of biological diversity and the environment and the sustainable production of domestic and commercial produce.”

The forest reserves will be managed by the institutions of the state explicitly in the national interest and for the benefit of the local resource owners; the global interest in biodiversity is also acknowledged. The Policy accords the protective values of the reserves prior to production.

In the old framework, the timber contractors had de facto become the primary client of those institutions charged by society with managing the permanent forest estate. The timber contractor was able to use his accumulated wealth to influence the operations of the state in his favour! Under the new policy it is envisaged that the rural resource owning communities will be re-instated as primary clients of resource management with an inalienable right to real monetary gains from resource management.

The Forestry Commission as the manager of the forest estate advertises forest contract areas and awards contracts on competitive basis to deserving timber contractors to undertake operations prescribed in the management plan in the interest of the clients. The contractors are required to operate in an environmentally and socially responsible manner and will be engaged on contractual terms that allow for a reasonable profit. The old concession system has been abolished and replaced with a new TUC system, which favours efficiency, transparency and accountability in the timber operations.

Outside the forest reserves, the Policy recognizes the immediate need for “Inclusion of unreserved forests under Forest Services Division’s management system for regulation of uncontrolled harvesting and promotion of resource development programs, encouragement of local community initiatives, enhanced land and tree tenure rights of farmers.” The long-term objective of forest resource management outside reserves is to ensure greater local control over resource use and to promote forestry with agriculture to create vibrant rural economies based on judicious use of renewable resources.

1.3.3 Strategies for Sustainable Forestry
The Forest and Wildlife Policy includes a set of strategies to achieve the new sustainable forest resource use objectives and to begin to dismantle the old political economy. These strategies are, \textit{inter alia}:

- Competitive procedures for allocation of forest utilization contracts to ensure only capable and properly equipped operators will have access to the resource; concession leases will be replaced with Timber Utilisation Contracts
- Effective felling controls and standards will be introduced on and off-reserve to ensure compliance with a sustainable AAC
- Market-led pricing of forest products to reflect the economic value of the resource, to ensure efficient resource utilization, to provide adequate funds for resource management and an equitable share of revenue to the owners: stumpage will be linked to fob and significantly increased
- Improvement of accounting and timely collection of resource utilisation revenues in order to augment the finances of institutions
- Conversion of the timber industry into a low volume, high value industry; value added processing will be encouraged
- Private sector investment in commercial plantation development will be encouraged
- Revision of resource management standards and prescriptions for sustainable forest management
- Establishment of databases and information linkages to facilitate decision making and policy analysis
- The Policy places particular emphasis on people’s participation in the management of forest resources with rights to consultation, access and benefits
- Promote public awareness and involvement of rural people in forestry and wildlife conservation
- Review of legislative instruments and administrative arrangements to ensure effective resource management
- Institutional reform of the Forestry Department into a Forest Service outside of the Civil Service and founded on a modern, business-like and rational corporate culture and a commitment to the provision of cost-effective resource management services

1.3.4. Progress Made So Far

Considerable progress has been made since 1994 in implementing the strategies outlined in the Forest and Wildlife Policy and incorporated into the 1996 Forestry Development Master Plan.

- \textit{Developments in Forest Conservation:}

\textbf{Timber Utilization Contracts(TUC)}

The Government suspended the granting of new concessions in 1991, strenuous efforts have been made since then to replace timber leases with timber utilization contracts awarded on the basis of competitive tendering.

\textbf{Effective Felling Control and the AAC}

In 1996 the Government confirmed its acceptance of the new combined AAC (of 1 million m³ on and off reserve) and its determination to introduce new felling controls to ensure compliance with the AAC.
Within the reserves, once the needs of forest reserve protection have been catered for, the remaining healthy forest in effect constitutes the permanent national timber production area. At present this is estimated at 762,400 ha or 47% of the total area under reservation. The FSD has also updated its felling procedures on reserve to ensure harvesting can be kept within the limits of the AAC.

The basic elements of the system are (a) the preparation of harvesting schedules to define the order in which compartments are harvested (b) stock surveys (100% enumeration) in each compartment to determine which trees are available for felling (c) calculation and allocation of the actual yield, based on application of a yield formula (d) issuance of a felling permit.

Outside reserves the main elements of the system are (a) pre-felling inspection of trees by farmers and contractors (b) issuance of felling permit (c) payment of compensation for crop damage (d) issuance of conveyance certificate for removal of logs. The new system has allowed farmers to monitor (and indeed veto) logging on their farms.

- **Resource pricing:**

Timber royalties were originally negotiated locally between chiefs and the contractors. Since 1961, national rates were set for each economic species but administrative procedures had no links to market realities. The chiefs maintain rates at the same pitiful price, generally less than 2% of fob prices. The new policy has introduced prices per tree stumpage, set at 20, 10 or 5% of the fob price depending on resource scarcity.

- **Promotion of value-added processing:**

A temporary suspension on log exports was introduced in November 1995 following the government’s inability to introduce a system of realistic and punitive levies on log exports. In 1997, following persistent opposition, levies on air-dried lumber were finally enforced, two years after the legislation was passed. A series of subsidies to encourage kiln drying, processing of lesser used species and staff re-training have been introduced.

- **Natural Resources Management:**

As indicated earlier, the 1994 Forest and Wildlife Policy marks a turning point in the affairs of forestry. The new Policy began a new process and in 1996 when the Government launched a Forestry Development Master Plan to guide the execution of the Policy in the short, medium and long term. In order to ensure that Ghana has the resources, action plans and necessary degree of coordination to implement the Master Plan, the Government has prepared a ten-year sector investment program known as the Natural Resources Management Program (NRMP). The NRMP has been designed in Ghana and provides a framework by which the government can direct and coordinate donor inputs.

The ten-year goal of the NRMP is to “protect, rehabilitate and sustainably manage national land, forest and wildlife resources through collaborative management and to sustainably increase the incomes of rural communities who own these resources”.

The most ambitious component of the NRMP is savannah-resource management. This program aims to establish community-based integrated resource management that will unite forestry and agriculture. The program has an explicit poverty-alleviation focus and requires a
reorientation of government services from a supply-led to a demand-led approach. The FSD will gradually divest itself of responsibility for the forest reserves in the northern savannah zone. The reserves will be handed to the local communities and assemblies to be managed as part of integrated resource management systems.

In the high-forest zone, the objective is to establish the policy, legal, administrative and technical bases for sustainable forest management, including biodiversity conservation, collaboration and efficient utilization of forest products by the private and public sectors. During the first two-year period of the NRMP, the project intends to:

- Establish and strengthen the Ghana Forest Service
- Create public awareness in forestry issues
- Introduce new reserve management systems, including collaboration
- Operationalize the TUC system
- Pilot new collaborative resource management off-reserve
- Introduce commercial plantation schemes
- Introduce certification of the management of Ghana’s forests

**Private sector investments in plantation development:**

About 24% of the forest areas are so degraded by bush-fires and over-logging that they have to be converted to plantations. Little has happened since 1983. The under-pricing of the standing resource has generated few funds for resource creation and even fewer timber companies see any reason to plant. The relatively small plantation resource that was established by the Forest Services Division in the 1970s is generally of poor quality and not well managed. These areas are being constituted into Land Banks for plantation development and a Plantation Development Fund being created to assist private investors.

**Revision of forest reserve management systems:**

In the case of the forest reserves, the new Policy requires that the interests of protection, production and local people all be catered for. A new system of strategic management planning has been devised to help agree objectives in consultation with local people. In addition a new Protection Strategy and a Collaborative Management approach has been worked out.

At the heart of the new system of forest reserve management is the new strategic planning system, which sets the agreed objectives for the management of that particular resource. The plans are strategic documents, which constitute an agreement on the objectives of forest resource management between the managers and the clients. Following extensive surveys and consultations, the local forest manager who then seeks the endorsement of the resource owners and the approval of the Forestry Commission drafts the final plan.

**Special Biological Protection Areas:**

In 1992 the Forest Services Division completed an extensive botanical survey of the forest estate. Using the results of the survey, a star rating system has been designed to assign each species to a category denoting its conservation priority. Black Star species are the highest priority for protection followed by Gold, Blue and Green Stars respectively. Star values can be manipulated to help forest managers identify genetic hotspots throughout the high forest zone. The numeric value related to the hotspot is known as its Genetic Heat Index (GHI). Forest reserves or portions of reserves with a high Genetic Heat Index (greater than 150) are
designated as Special Biological Protection Areas and are permanently removed from production.

- **Collaborative Forest Management and Forest Management Plans:**
  Collaboration will re-establish the local communities as primary clients of the FSD with a right to benefit from the wise management of their resource. Collaboration will help ensure that reserve management is equitable and more efficient and ultimately socially sustainable.

The starting point for collaboration is strategic planning; the process by which the objectives of forest reserve management are agreed and management zones for Protection and Production are defined. Following a series of resource surveys and consultations, the first draft of the management plan is presented to the resource owners at a Reserve Management Planning Workshop. The workshop provides the Forest Services Division with the opportunity to explain the new forest policies, the Production and Protection strategies, and the respective roles of the resource owners, the resource managers and the resource utilization contractors.

- **Forest Management Certification Approach:**
  Ghana embarked on the forest management certification process in 1996 after a national stakeholder forum held in Kumasi. At the workshop, the stakeholders agreed that certification should be embraced as an important tool in forest management and accountability since it was an essential mechanism which could be used to achieve sustainability of forest management as well as producing forest products aimed at environmentally sensitive markets in Europe.

  The certification process was initiated through the creating of a National Committee on Forest Certification (NCFC), chaired by the Technical Director of MLF and comprising stakeholder representatives from sector agencies, trade associations and unions, NGOs, traditional landowners and Ghana Standards Board, the research and university organizations as well as the workers of Ghana represented by the TUC. Subsequently a Technical Working Group (TWG) of the NCFC was commissioned, comprising seven technical specialists, to develop a reference document of Principles, Criteria and Indicators.

  Through the assistance of the European Union and the Netherlands Embassy, a Ghana Forest Management Certification System Project was initiated in 1997 to assist Ghana to establish a fully functioning national certification scheme and to establish a comprehensive computer-based system for log tracking. Through the project, the Ministry has been able to finalize draft standards based on the sustainable forest management system with active stakeholder consultation and collaboration. The draft standards were tested in the field in March 2000 at various locations in the country. A three-day international workshop was therefore organized in Accra from April 27 to 29 2000, to share the findings of the field study and to carry the certification process forward.

**1.4 OUTLOOK OF OTHER FORESTRY RELATED SECTORS IN THE NATIONAL ECONOMY**

There are other sectors in the national economy that have significant impacts on the future outlook of the forestry sector in the country. These sectors include the national population and related urban development, agricultural development, road infrastructure development
and mineral mining. The on-going activities and development policies and strategies of these sectors, as stated in the national development framework, have been analyzed to show their impact on the forestry sector.

1.4.1 Economic Development framework: Ghana Vision 2020

Ghana’s new development agenda, Ghana Vision 2020, is strategically designed to achieve a middle-income status for Ghana by the year 2020. The thematic focus of Vision 2020, which was launched in 1995, includes economic growth and macroeconomic stability, sustainable and equitable development, effective mobilization on investment resources, efficiency in the use of available human and financial resources, effective financial mediation that is growth inducing, poverty reduction in targeted communities, rural and urban development, environmental protection, human development, good governance and private sector development.

The overall GDP is targeted to increase at an average growth rate of 8%. A more coherent set of policies has been prepared, with population growth rate falling from 3 to 2%.

1.4.2 National Population

The 1984 census revealed that the population was 12.3 million indicating that the population doubled within 24 years. The recent census held in March 2000 has provisionally estimated the country’s population as 18.9 million indicating an annual growth rate of 3.0%. Based on this growth rate it is postulated that the country’s population will reach 33.0 million by 2020 if no effective population control policies are put in place. The average population density is 71 persons/km², but the actual population distribution is very uneven from one region to the other.

National Population Policy:

Under the Ghana Vision 2020 the following policy targets have been set:

- Reduction of the annual rate of population growth of about 3.0% (1998) to 1.5% by 2020, as well as reducing the total fertility rate from 5.5 to 4.0 by the year 2010 and 3.0 by the year 2020
- Achieving contraceptive prevalence rate of 15% for modern family planning methods by 2000 and 50% by 2020
- Reduction of infant mortality rate from its current level of 77 deaths per 1000 live birth to 24 by the 2020 and reduction of maternal mortality ratio from its current level of 214 maternal deaths per 100,000 live births to 55 by 2020
- Enhancing access to quality reproductive health care, including prevalence prevention and management of reproductive track infections, sexually transmitted diseases including HIV/AIDS
- Strengthening the capacity to integrate demographic factors into national development planning and policy formulation

Implication on forestry outlook:

Rapid population growth is one of the root causes of poverty and forest resource degradation in Ghana. Increases in population growth coupled with migration, especially in the forest areas, also account for the high rate of deforestation. As population density increases and land becomes scarce, its value rises and farmers then find it cost-effective to intensify production.
Others resort to clearing virgin forest for additional cultivation. The poor tend to be pushed onto ecologically sensitive areas with low agricultural potential (for example semi-arid savanna, erosion-prone hill-sides and tropical forests). The situation is aggravated where large-scale farmers respond to growing pressure to expand primary commodity export and thus enlarge the areas on which cash crops are grown. There is evidence that large landowners do not protect the quality of their land and soil as much as do small farmers who own their land (Pearce 1986: 48-56).

1.4.3 Urban Development

Ghana’s estimated 18 million people live in about 48,000 settlements, of which 185 are classified as urban, with population excess of 5,000 persons per settlement. Nearly a third of Ghana’s population lives in urban towns and that number is growing. Together, the five largest cities, Accra, Tema, Kumasi, Sekondi and Tamale account for 50% of the urban population.

Comparative country data shows that economic development and urban growth are closely linked, that per capita incomes are consistently higher in urban areas and that urbanization increases more rapidly with economic growth at lower income levels than at higher ones. As the economy continues to expand and grow, urbanization can be expected to accelerate, placing even greater stress on the already overburdened system.

The cities and the urban towns, as centers of industry and service, contribute more than half of National GDP. Urban settlements also play a vital role in rural development as markets and service centers. The Accra-Tema metropolis alone accounts for over 15-20% of GDP and employs over 10% of the national labor forces.

The main challenges facing urbanization in Ghana are:

- Inadequacy of urban infrastructure and services such as roads, water supply, sanitation, and solid-waste management, in the face of fast growing population
- Urban population growth rates are high, ranging between 3.2 and 4.8% over the past decades
- Building capacities in planning, management, finance and operation and maintenance
- Weak municipal institutions are unable to provide adequate services to assure the sustainability of services and investments or to mobilize funds for adequate operation and maintenance.

- Implications on future forestry outlook

Land clearing for settlement establishment occurs during the expansion of urban and/or rural built-up areas and construction of roads. The National Land Use Planning Committee estimated in 1990 that a unit increase in the urban population requires an additional land area of 33.3 ha for the provision of additional housing, infrastructure and other social services. This gives a clear indication that with increase in urban population, more land is required for technical and social infrastructure development. Usually, substantial parts of the forest reserves are lost to infrastructural development especially during road construction, extension of electricity grids etc. As the urban population increases, therefore more forestlands would be converted into other uses thus limiting the forest resource base.
1.4.4 Road Infrastructural Development

The transport system is the national asset, which are the main arteries and veins for socio-economic development. The transport system consists of about 40,000 km of roads (trunk, feeder and urban), a rail network of 950 km, 2 deep-sea ports, one international airport and 5 domestic airports and the Volta-lake transport system.

In line with the overall national economic objective to make Ghana a middle-income country by 2020, the transport sector’s vision is to make the country the transportation hub of the West African sub-region. This vision seeks to make Ghana the most easily accessible nation within the sub-region so that it can be a good starting point to gain access to other parts of the sub-regional investment and trading.

- Implication on future forestry outlook:

Under the medium-term road infrastructure program, Ghana intends to develop and reconstruct 1,188.2 km of road between 2000 and 2002 through donor assistance. Through its own funds the country will construct 835 km of road within the same period.

The massive construction of roads will be directed towards the forest reserves, which will further reduce the forest resource base. Most places would be opened up to accelerate migration encroachment and clearance of forests.

1.4.5 Agricultural sector

The agricultural sector is the dominant sector in the Ghanaian economy. It is by far, the dominant land use in Ghana and shifting cultivation is the main method, using a long fallow rotation. The agricultural sector is made up of 5 sub-sectors namely: crops other than cocoa, (61% of agricultural GDP), cocoa (14%), livestock (7%) fisheries (5 %) and forestry (11%).

Smallholder farmers on family-operated farms, using rather rudimentary technology, produce about 80% of the total agricultural production. Only some of the industrial crops such as oil palm, rubber and pineapples are produced on large corporate-managed estates although smallholders also produce significant shares of these crops, especially palm oil. In 1996 60% of the 2.0 million farm holders cultivated under 1.2 ha per holder another 25% cultivated between 1.2 and 2.0 ha per holder while the remaining 15% had holding of over 2.0 ha. On the average 62% of the holders were males (46%-98% across the 10 regions). About 30% of the holders were 50 years or older.

In general, the size of agricultural lands increases every two years by 9%, which indicates the threats of agriculture on forestry development. Increase in agricultural production has been achieved primarily by using more extensive farming methods (especially more land and labour) and only secondarily by an increase in productivity through the application of improved technology. Fertilizer usage, which averages 6 kg/ha with a wide variation across crops, is one of the lowest in Sub-Saharan African.

Out of a total land area of 23.8 million ha, 13 million ha representing 57% of the total land area of Ghana is said to be suitable for agricultural production given current technological know-how. However, the total cultivation in 1994 was only 5.3 million ha representing 39% of the total area suitable for cultivation. Total area under irrigation is 10,000 ha while the area under inland waters is 1.1 million ha.
Agri-cultural Performance:
The agricultural growth over the last decade averaged 1.9% only. Slow growth in the early 1990s raised concerns about effectiveness of policies to privatize and liberalize agricultural production and marketing. The modest performance of the agricultural sector has serious implications for the poor since poverty in Ghana is largely a problem amongst rural inhabitants, who are engaged in agriculture.

Problems facing the Agriculture Industry:
- Non-integration of agriculture with industry
- Inadequate financial services and the high cost of capital
- Inadequate access to appropriate technology
- Underdeveloped infrastructure
- Absence of effective agriculture laws and regulations governing the acquisition and disposal of property
- Limited access to the regional and international market

Challenges:
- Achieving and sustaining food security at the household and national level
- Contributing significantly to poverty reduction.
- Increasing and sustaining agricultural growth rate at 6% per annum to support the attainment of the objectives of VISION 2020.
- Increasing access to medium and long term capital at affordable and sustainable interest rates with emphasis on poor farmers
- Increasing merchandise exports, particularly non-traditional agricultural exports
- Attracting private investment into the sector.

Agri-cultural services sub-sector investment program:
Agricultural services sub-sector Investment Program is the main instrument for the implementation of the Accelerated Agricultural Growth and Development Strategy (AgSSIP). The purpose of AgSSIP is to help to reduce poverty and to improve food security by providing essential services and securing and enabling an environment for sustainable and equitable growth. The AgSSIP is a three to five year rolling plan divided into four thematic groups of sub-programs and projects: Agricultural Support Service, Institutional and Regulatory Improvement and Capacity Building, Public Infrastructure and Improved Access to Markets and Development of Agricultural Business Sector. The successful implementation of this project will introduce efficiency in the agricultural sector, which will minimize the expansion of farmlands.

1.4.6 Mining in Forest Reserves
In the past, mining operations in the forest reserves were restricted and the few that were allowed operated under strict operational guidelines, which regulated the exploration activities. However since the launching of the economic recovery program certain international gold mining companies were granted permit to carry out mineral exploration within Forest Reserves.

Following persistent public outcry, and arising out of the growing concern for the depletion
of Forest Reserves and degradation of the mining environment, the Ministry placed a ban on mineral operations in Forest Reserves in 1996. However, it was recognized that some companies had reached advanced stage of exploration, spent substantial sums of money in investment and had not contravened any of the terms of the permit under which they were operating. It was therefore agreed that 16 companies would be allowed to continue exploration. Later, in 1997, a policy decision was arrived that at 2% of the production areas of the Forest Reserves exploration activities would be made available. Guidelines for mining in forest Reserves have since been drafted and implemented.

Aside the large-scale mining a lot of illegal mining activities are now taking place in closed mining areas. These illegal mining activities are uncontrolled and are not allowing the forest to regain from its intensive mining shock. The situation has further degraded the lands in these areas.

2. DRIVING ENGINES & FACTORS OF CHANGE IN THE FORESTRY SECTOR

The pressures on Ghana’s forests have been recognized for many years with “alarming deforestation” noted as early as 1908. Agricultural changes were partly responsible over many years for the forest loss, but recent evidences show that there are other driving forces and factors, which have influenced the face of forests in Ghana.

There are indications that Ghana has never successfully practiced sustainable forest management. The forests have been depleted and degraded and the sector is now characterized by excessive harvesting of logs over and above the AAC, reduction in standing volumes of species, dwindling resource base, species depletion and loss of biodiversity.

The driving engines that have shaped the structure and composition of the forestry are logging, unsustainable farming, annual bushfires, surface mining and infrastructural development. Underlying these driving engines are forest policy failures, unrealistic forest fee regimes, external prices of timber and weak institutional structures.

2.1 DRIVING FORCES & FACTORS OF CHANGE

2.1.1 Excessive Logging

The harvesting of timber is the most important single factor contributing to deforestation in Ghana. However in 1991, logging operations accounted for only 14% of the deforested areas in Ghana (FSD Annual Reports–1962-94). Outside the Forest Reserves logging has been on the increase mainly due to lack of effective control. In recent times, logging activity has been intensified more in the semi-deciduous zones than in the evergreen forest due to greater densities of desirable timber species. These drier zones are now in critical conditions partly due to logging.

Illicit logging activities due to poor supervisory role of the Forest Services Division are also having a serious toll on the timber resource base of the country. The Division lacks resources and logistics to adequately monitor timber operations and to ensure that timber contractors comply with the provisions in the logging manuals.
A major problem associated with the logging procedure is the insufficient attention given in the yield allocation process. In the process of harvesting, seed trees, which influence regeneration, are supposed to be left behind. Unfortunately due to lack of adequate information, such trees are not identified and stock mapped leading to the harvesting of all trees, which have strong influence on forest regeneration.

When logging is appropriately managed, then it needs not to be a serious threat to the forest vegetation. The problem is that logging in recent decades has certainly not been managed appropriately, and this is the main reason for the poor quality of many forest areas. The detrimental effect of logging on the resistance of the vegetation to “natural” hazards, particularly fire, is the most serious risk of heavy exploitation.

2.1.2 Unsustainable Agricultural Practices

The area of land under agriculture increases every year due to the extensive system of farming being practiced in the country, which also involves cutting of vegetation. The traditional bush fallow system of cultivation involves slash and burn of forest and grassland. However, long falls necessary for the forest to regenerate fully is only possible if population growth and pressure on the land are low. With increasing national population over the last two decades, demand pressure on land has been considerable. Demand for subsistence agricultural cultivation has been compounded by demand for cash crops like cocoa, coffee, oil-palm, tobacco and for urbanization and infrastructural development.

Farming whether under the Taungya system or not is seriously bad in conservation terms where it is either persistent or occurs over large areas. Only few temporary farms may well recover to good forest when abandoned. It is known that farming established in the forest areas is a fait accompli, much harder to remove than to prevent in the first place and also a timorous source of fire within. Although there are limited empirical data on the extent of deforestation, the specific location and acreage, Agyemang & Brookman-Amissa (1987) attributed 70% of deforestation to shifting cultivation (bush fallow). Some areas have been badly blighted by farms due to local pressure for land. Such pressures are unlikely to be abated and new farms, which prevent regenerating phases of the vegetation, are likely to increase.

Conversion of areas of reserved forest into plantations of exotic trees like cocoa, Teak (Tectonic grandis) and *Gmelina* is also another source of deforestation in the country. The Taungya systems have failed disastrously in many areas and several areas, which ought to have been completely protected, have been reduced to *Eupatorium-solanum* fire hazards.

The trend that the forest resources have been under persistent attacks by agriculture partially due to the absence of a national land use plan, contributed also to a decrease in forest area.

2.1.3 Bush Burning

Forest fire has been the immediate cause of most forest degradation in the country over the last few years. According to data gathered over the years, every year about 30% of the forest areas are destroyed by fire. Bushfires occur annually in the dry season usually from November to May.
The causes of bush fires are both intentional and unintentional. Intentional fires are called early burning used as a management tool to reduce the ferocity of late dry-season fires in vegetation near the forest-savannah boundary. Though this management practice has been in use since time immemorial, it has a negative influence on forest regeneration and contributes significantly to deforestation. Unintentional fires result from activities of hunters who may fail to extinguish campfires.

More than 1 million m³ of exportable timber have been lost to fire over the last decade. Burnt forests are dominated by pioneer trees of little economic merit and are more prone to burn in the future. Fire is now the greatest threat to the long-term survival of half the forest in Ghana. Fire prevents forest from developing into primary forest and records indicate that only 20% of the forest zone is currently covered by forest which has not burnt regularly (Hawthorne (1994). Fire Damage and Forest Regeneration in Ghana).

2.1.4 Mining & Quarrying

Open cast mining activities for gold and diamond, especially those by the small-scale operators and large-scale mining for bauxite, manganese and gold, pose serious threat to forest in the forest region of Ghana. Iron ore extraction around Awaso (Afao hills) and bauxite mining at Atewa and Tano-Ofu and surface mining in the Western and Ashanti Regions are also serious threats to the forest.

Layout of mines and infrastructure (including waste dumps, storage, tailings ponds, plant yards, roads and accommodation) destroy large areas of forestry reserves. Today, gold mining poses the greatest threat, particularly to reserves in and near the genetic "hotspots" of the wet evergreen zone.

Most of the mineral belts in Ghana with geological information are located south of latitude 8° north and this is the area where mining activities are most concentrated. Incidentally this is the area within which the forestlands are located. According to the recent national development policy, Ghana intends to place 2% of its production forest reserves under mining.

Most of the mining operations are surface based and contribute to
- Destruction of vegetation including economic trees and cash crop
- Destruction of water resources and watershed from the forest environment
- Pollution of sources of drinking water for the rural people

2.1.5 Settlement & Related Infrastructural Construction

Land clearing for settlement establishment occurs during the expansion of urban and/or rural built-up areas and construction of roads and their infrastructural development. The tremendous increase in the proportion of total population growth absorbed into the urban areas has implications for the supply of urban land for housing and for the provisions of infrastructure and other social services.

2.2 UNDERLYING CAUSES OF FOREST DEGRADATION

As noted in the previous sections, forest depletion and degradation is the effect of the complex interactions between social, cultural, political and commercial factors. The forest resource-
using activities and forest degradation are at first sight only remotely connected. This relationship, however, is based on the sound understanding of not only physical linkages among events but also the equally complex economic, financial, social and institutional linkages that parallel them. Most of the underlying factors that are affecting the forestry outlook are therefore behavioural.

The behavioural factors develop a better understanding of individual and institutional behaviour that relates to resource use. It is a disciplinary approach and the analysis of causes are more fundamental to the way society works.

2.2.1 Lack of Stakeholder Participation in Forest Management

In Ghana most rural communities live very close to the forest and are major and direct consumers of the goods and services from the forest; especially the non-timber forest products. They are the major and direct cause of deforestation and other forms of ecological and environmental damages. Thus their exclusion from forest management through policy makes them lose self-image as trustees of the forest resources.

There is evidence that the rate of deforestation has seemingly declined since the concept of community participation in forest management was introduced about a decade ago.

2.2.2 Low Forest Taxes & Fees Regime

Forest revenue is generated mainly through royalties, rental fees and silvicultural charges. From the economic point of view often in the timber industry, a substantial residual economic value remains (before tax) after accounting for production costs and imputing sufficient profit to sustain the enterprise over the long term. This residual value or stumpage value in reference to the value of the standing timber is the maximum price a logger would be willing to pay under competitive condition to the government. If the government leaves a large proportion of the stumpage uncollected, pervasive economic incentives sets in to influence the rate of log harvesting. Thus the forest revenue regimes have a critical role in determining the rate of environmental decay.

The Ghanaian forest authorities have frequently established inappropriate forest revenue systems in which the timber royalties do not cover the cost of managing the forest. The forest fees do not cover the full economic cost neither does it cover full operating cost. Until recently, timber royalties were charged per tree and value was estimated at less than 2% fob price per m³ of round log multiplied by the average tree volume of the species at the minimum felling diameter. The logger’s liability was assessed from the yearly log production complied by the Forest Products Inspection Bureau. The system is inefficient as a mechanism for recovering stumpage value, thus promoting wastage both in the forests and mills.

An analysis of the forest fees in Ghana shows that forest fees have been too low in absolute terms to protect the resource or slow down exploitation. The current system has resulted in an inadequate market incentive differentiation between species, thus leading to over-exploitation of highly desirable timber species and under-exploitation of abundant but less-desirable species.

2.2.3 Weak Institutional Structures
The failure of the Forest Authorities to adequately control and manage the forest sustainably has resulted in large-scale encroachment on the forest reserves. Weak administrative machinery to monitor and patrol the forest is also the underlying factor for increasing bush fire in the forest areas. The weak administrative machinery may also be the result of inadequate funding for the operations of the forest authorities.

The weak administrative machinery is often a measure of the gap between projected revenues and what is actually collected, or the ability to generate enough revenue to cover the cost of operation. The income generating ability of the Forest authorities determines the efficiency in managing the forest. Until 1998, the FSD was able to collect less than 58% of its potential revenue due to be collected. The Service was therefore unable to cover the full cost of forest management. It could not acquire the basic equipment needed for forest management and monitoring. This gave rise to widespread illegal timber operations across the country. The illegal operator became very sophisticated and could outwit the forest authorities in their illegal operations.

2.2.3 Lack of investments in the forestry sector

Investments in the forestry sector can have an indirect pressure on the forest. Where people fail to invest in timber plantations, it exerts undue pressure on the natural forest since the demands of the installed milling capacity exceeds the supplies for the forest. In the past the private sector failed to invest in the timber plantations for almost a century and the natural forest continued to be the source of raw materials for the over-capacity milling industry.

2.2.4 Population Pressure

Rapid population growth is one of the root causes of poverty and forest resource degradation in Ghana. The rapid population growth since independence, coupled with internal migration, also accounts for the high rate of forest degradation. In most parts of the country especially in Western, Ashanti and Central as the population density increases and land becomes scarcer, its value rises and farmers then find it cost-effective to intensify production. Others resort to clearing virgin forest for additional cultivation of cocoa. The poor and landless peasant farmers tend to be pushed onto ecologically sensitive areas with low agricultural potential (for example semi-arid savanna, erosion-prone hill sides and tropical forests). The situation is aggravated where large-scale farmers respond to growing pressure to expand primary commodity export like cocoa and cashew and thus enlarge the areas on which cash crops are grown.

Related to population growth is the growth in urban settlement and a changed urban land use pattern. The growth in urban population means an increase in demand for land for constructional purposes.

2.2.6 Policy Interventions Failures

Another stream of factors responsible for the forest degradation in Ghana is policy intervention failures. The traditional approach to solve environmental problems is for the public authorities to promote natural regeneration programs and activities controlling pollution. Where these policy interventions fail, the rate of deforestation stands out glaring. Most of the natural regeneration efforts that have been started, failed due to ill planning, uncoordinated efforts and lack of resources.
The failure of the Taungya system in the reforestation strategy in the mid-1970s accounts for the large track of degraded forestlands in the transitional zone. Under the Taungya system, farmers were allowed to cultivate food crops in forest reserves while the forestry authorities planted timber trees. However, due to poor supervision and unclear terms of future benefits, most farmers flouted the terms and conditions regulating the operations and thus failed to nurture the trees resulting in large degraded areas.

Government’s policy of waiving export taxes on some processed wood products, subsidized credit and export financing, tax holidays and concession bases as stated in the 1989 Investment Code of Ghana, encouraged over investment in the milling sub-sector thereby encouraging over-exploitation of timber resources.

Thus the Government policies in most cases have had adverse effects in both environmental and standard economic terms and offer fairly direct incentive for wasteful environmental management. Implicit in this analysis is the fact that ineffective government policies dealing with forest offences have lead to increased forest degradation. The increasing trends in forest offences are due to abysmally low court fines that are imposed on forest offenders. In most cases, it is more profitable to break the law and be fined than being honest with the law. Government policies therefore have greater influence on the rate of deforestation.

2.2.7 Poor Institutional Coordination

Although the activities of most agencies in the other sectors of the economy like agriculture, mining, road infrastructure and population have direct impact on the forest resource base, yet there are no mechanisms for coordinating the activities of these institutions. Lack of effective coordination and communication has resulted in increased assault on the forest resource base, which has contributed to its fast degradation.

3. A VISION FOR THE FUTURE OF THE FORESTRY SECTOR IN GHANA

The 2 previous chapters have shown that the forest resource of Ghana is under increasing pressure. Although the new forest policies seek to address the problems, the change will be slow and it will take several decades for the results to seen in forests themselves.

Ghana has embarked on an economic development path, which seeks to transform the country into a middle-income country by 2020. Through this program Ghana has become a favourite of most bilateral and multilateral donors, who are keen to prove that IMF-backed structural adjustment program can lead to sustainable improvement in the economic performance of the country. The annual economic growth rate is expected to be 8% up to year 2020.

3.1 DEVELOPMENT ISSUES

The forest resource is not a free resource in infinite supply. The ability of the forestry sector to contribute to human welfare in direct ways under rapid economic growth needs careful examination in order to link economic growth with changes in the forest resource base. The future is unknown, therefore under the VISION 2020, certain key development issues need careful analysis in order to ascertain that forestry would fulfil its role in the development
process. Among the issues to be examined are how to:

- Maintain sustainable forest productive system to provide for the goods and services needed under the Vision 2020
- Preserve, characterize and use the forest to guarantee employment, sustainable incomes and food supplies for the growing population, and preserve the socio-cultural value of forests to the people without causing damage to the forest resource base
- Link economic growth to the conservation of forest resources in a sustainable way

3.1.1 Development questions

In resolving these key issues certain questions are eminent:

- Will there be enough wood to meet the future export and domestic demands of the country in the year 2020?
- Will the forest resource base be able to satisfy the demands of the Vision 2020 without further degrading the environment?
- What will be the stocking and exploitation levels of the main timber species?
- Can the Annual Allowable Cut be sustained?
- Will Ghana be able to maintain its share of the global timber market without destroying its timber resource base?
- Can Ghana continue to rely on the natural forest for its supply of future timber?
- What will be the future size of the forest resource base? Will it increase or decrease?
- Can the off-reserved forest be brought under sustainable management?
- Will timber certification be successful in Ghana?
- Will the community involvement in forest management bring about effective and efficient forest management?
- Has the Forest Authority enough resources and capacity to ensure sustainable forest management?
- Will a national land use plan ensure effective integration between agriculture and forestry?
- Can sedentary agriculture be promoted as a solution to the shifting cultivation, thereby securing the forest base?

3.2 TRENDS & UNCERTAINTIES

Finding answers to these questions requires an analysis of trends and uncertainties in the national economy and the forestry sector. The trends relate to economic, monetary, fiscal, agricultural population and forestry policies.

3.2.1 Policy trends

- **Economic Policy:**
  - Structural adjustment programs will be continued to target at achieving sustained macroeconomic stability, increased support for the private sector, development of economic infrastructure, promotion of products made in Ghana in support of agricultural and industrial employment and increased investment in the wood industry
• The country will continue to rely on cocoa, gold and other minerals as the country’s main foreign exchange earners. Thus conversion of forestland into cash crop farms and surface mining in forest areas will continue into the next two decades
• Investment incentive and export oriented programs favouring investment in the secondary wood milling industry

  o Monetary and fiscal policies:
  • Rising inflation, high interest rates and slow economic growth

  o Agriculture:
  • Expansion of cocoa production by converting forest lands into agriculture
  • Slash and burn and shifting cultivation farming
  • Annual bushfires

  o Population:
  • High population growth and fertility rates
  • Increasing urban population
  • Limited access of rural population to services or supply of contraceptives

  o Forestry:
  • Reliance on natural forest for the supply of raw timber materials
  • Increasing installed milling capacity over and above the AAC
  • Increasing illegal logging of timber to satisfy domestic demand
  • Low investment in plantation development
  • Increasing community involvement in forest management
  • Reliance on few prime species for export
  • Increased investment in primary and secondary processing with limited growth in the tertiary processing
  • Institutional reforms to make the Forest Services Division semi-autonomous
  • Limited resources to promote sustainable forest management practices
  • Promotion of private sector-led plantation development programs

3.2.2 Uncertainties

  o Political Uncertainties:
  • Will there be enough political will to implement the major forest policies that have been initiated to ensure sustainable forest management?
  • Will local communities continue to participate in forest management?

  o Economic Uncertainties:
  • Will donors continue to support the forestry sector through the implementation of the Natural Resources Management Project to consolidate sustainable forest management?
  • Will the forest stumpage revenue be enough to cover the cost of forest
management?

- **Uncertainties in the Wood industry:**
  - The promotion of value-added production is likely to be constrained by lack of skilled labour, inadequate supply of raw material and lack of marketing expertise in mills.
  - The introduction of lesser-used species into the world market through further processed downstream wood may not make any impact, Ghana will continue to rely on the few prime species.

- **Forest Management Uncertainties:**
  - Will the Forest Certification scheme promote sustainable forest management?
  - Will there be a price premium on exported certified wood products to ensure that the cost of forest management is covered?
  - Will the current reforms in the forestry institutions ensure efficiency, accountability and lead to sustainable forest management?
  - It is uncertain whether the ban of export of round log will continue to be in force and whether it could enhance sustainable forest management.

### 3.3 DEVELOPMENT SCENARIOS

The trends and uncertainties in the future outlook of the forestry sector described above, present Ghana with two sets of scenarios. Based on a planning horizon of 20 years, the first scenario describes “business as usual” named “**Muddling through Development**”. The second scenario termed “**Sustainable Ghana**” is based on the targets set under the Ghana Vision 2020 with carefully designed policies and increased investment in the forestry sector.

#### 3.3.1 Scenario 1: **Muddling through Development**

Under this scenario, there would not be any robust change and transformation in the forest sector by the year 2020. Due to the macroeconomic conditions, there will be a slow growth in the forestry sector and the annual growth rate would increase slightly from the present 1.9% up to 2.4% as it happened between 1994-95. The forestry sector will become the fourth most important foreign exchange earner after gold, cocoa and tourism. Its contribution to export earnings however will increase modestly to about 12% from the present 11%; contribution to GDP will increase from 6% to 8% by 2020.

Investment and development in the wood industry will be “business as usual” and direct employment in the wood industry will increase modestly from 100,000 to 102,000 due mainly to expansion in logging and secondary wood processing. The forestry sector will continue to support the livelihood of about 2.5 million people.

Investment in the wood industry will be in favor of secondary processing, thus increasing the installed milling capacity further by 5%. There won’t be any appreciable increase in the export of the value-added processing, as technology will not improve to any appreciable manner. Although the ban on the export of round log will continue to be enforced, its impact would remain insignificant in the wood industry due to inefficiencies in the milling sector.
The forestry sector will continue to derive its raw materials from the natural forests. Illegal logging practices would continue due to the existence of effective demand for illegal products. The AAC would continue to be exceeded annually due to increasing milling capacity. Harvesting of species would not be brought within sustainable levels and most of the prime species would become economically extinct and the economic resource life of the ten most important species would be less that 10 years. Deforestation rates will continue to increase reducing the forest resource base by almost 10%.

Surface mining both legal and illegal will intensify as gold becomes the most important export product of Ghana and the policy towards generating enough foreign exchange to offset the balance of payment deficits remains. In view of this the 2% of the production forest reserves leased for mining exploration will become mining fields. Illegal mining will intensify and the rehabilitated and abandoned mining areas will not be able to recover. Due to poor enforcement of environmental laws and regulations by the Environmental Protection Agency, the Minerals Commission and the Forestry Commission, most of the mining companies operating within the forest reserves will fail to implement their environmental management plans to rehabilitate the degraded mining areas.

The forest certification scheme will fail to take-off and the gains of the certification project, which was successfully tested and the installed log tracking mechanism, will not be sustained due to lackadaisical attitude of the industry towards the certification process. Very few wood processing companies could produce timber from certified sources.

The drive towards timber plantation development, with the private sector as the leading sector will not produce the desired results. The annual planting targets cannot be met due to the misapplication of plantation development fund by the private sector. Besides, the state-owned timber plantations could not be expanded because of poor funding and poor silvicultural treatment given to the planted trees. Donors refused to provide funds as concessionary loans to the private sector to invest in timber plantation development. The plantation development program could not achieve its target of placing at least 200,000 ha of land under plantation within 20 years.

Forest stumpage could not be increased due to administrative inefficiencies and resistance from the timber industry. Forest revenue continues to fall in real money terms and the FSD could not generate enough revenue to support its forest operations and administrative expenses without government subsidies and external supports.

The restructured forest institutions could not operate in a business-like environment due to bureaucracy and “empire building”. The Forestry Commission could not decentralize effectively, leaving the regional and district level forest administration very weak and ineffective. There was very little logistical support to sustainable forest management practices, especially in the savannah regions.

The collaborative forest management philosophy could not catch up with the people because it lacked the legislative backing to make it operative. The stream of benefits, likely to accrue to stakeholders involved in forest management, were ill-defined and could not attract people to collaborate with the forest authorities in forest management. The result was that the national forest estate and the timber industry could not be developed to provide the full range of benefits to the society, in a manner that is ecologically sustainable and that conserves the environmental and cultural heritage.
**Summary of Impact of Scenario 1:**

- **Resource Base:**
  - There would be over-exploitation of the timber and the main 40 timber species may become commercially extinct.
  - Lumber export would decrease. This may force most secondary processing mills, currently breaking even, to fold up thereby creating unemployment in the export-based industry.
  - Deforestation resulting from excessive logging would be exacerbated and the environmental cost to the nation would increase.

- **Stocking and Exploitation of Main Timber Species:**
  - At least 16 out of the 40 main marketable species would be heavily over-cut at unsustainable rates, particularly in unreserved forests, while 14 other species would be hardly being utilized.

- **Economic Resource Life:**
  - A business-as-usual scenario has been constructed to estimate future harvest-profile for the top-twelve favoured species based on the assumptions under Scenario 1. Table 3.2 shows the economic resource life of the twelve most vulnerable species if current exploitation levels continue.

The analysis indicates that if timber exploitation continues at the 1993/1994 levels, then all the highly favored species would be economically extinct by 2006. Since these species include some of the most valuable and heavily utilized species, it will have serious implications on the national economy. Export volume will go down by 33% and the forgone value would be US$ 65 million annually. Most of the export-based industry will have to adjust by cutting down employment levels. About 100,000 people may lose their jobs.

From the analysis, there would be no resource development and growth in the national economy if the present trends in deforestation were not minimized. In order to maximize long-term economic returns from a sustainable harvest, deforestation would have to be minimized to maintain a high value of export consistent with meeting domestic demand. With a harvest of 1.0 million m$^3$ and domestic demand of 0.7 million m$^3$, then the net export could be around 0.4 million m$^3$ of round-wood equivalent (assuming that 25% of this material consisted of residues reprocessed for domestic market).

- **Biodiversity:**
  - Maintenance of biodiversity would be business-as-usual. No special consideration and efforts would be made to maintain the biodiversity. This will have an adverse effect on the environment in terms of soil and water conservation and quality of biodiversity.

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3 These species accounted for about US$103.4 million exports (excluding logs) in 1994 representing about 75% (by value) of the processed timber.

4 Resource life was calculated as stocking, less 1993 and 1994 cut divided by average annual cut in 1993 and 1994.
Development in Wood Industry:

- There will be very little development in the wood industry and current structure will remain largely primary and secondary processing. The level of wood waste would be high as there would not be any incentive to adopt improved techniques in the harvesting and processing levels.

Underlying Assumptions:

Economic Policy:

- Ghana will continue to pursue a structural adjustment program with priorities on achieving sustained macroeconomic stability, providing increased support for the private sector, development of economic infrastructure, promotion of products made in Ghana in support of agricultural and industrial employment and increased investment in the wood industry.
- The forestry sector would be expected to be the third most important export earner, generating timber export earnings up to US$ 500 million by the year 2020, an increase of 60% over the present export earnings.
- Liberalization of trade and payment systems will enable entrepreneurs to transact international trade. Government will continue to tighten its fiscal and monetary policies to curb inflationary pressure and regulate the exchange rates. The slide of the Cedi will slow, but the continued low prices for the export commodities and the substantial current-account deficit will maintain the downward pressure on the currency.
- Investment policy and fiscal incentives will continue to favour investment in the primary and secondary processing units. Installed milling capacities will continue to exceed the AAC thereby exerting pressure on the resource base.
- Government will continue its infrastructure development program and new investment in roads and other infrastructural developments will continue and substantial areas of forest would be lost to these development project.

Agriculture:

- The expansion of the cocoa industry will continue due to attractive local prices paid to farmers and to the reliance on cocoa exports as the main foreign exchange earner. More forestlands especially those in the tropical rain forest will be converted to cocoa farms. Encroachment on forest reserves will continue as the cocoa industry expands.

Population:

- At the current rates the population is expected to rise up to 33 million by
2020. Few people will have access to supply of contraceptives. The increased population will continue to exert pressures on the forest resource base stretching it beyond their capacities. However, the current population policy will be pursued vigorously to ensure a decline in fertility and fecundity rates; this should keep the population growth rates down.

- **Forestry:**
  - The forest sector will continue to pursue programs that will promote sustainable forest management, however, there would not be enough resources to support the strategy. The wood industry will continue to be export-oriented with the domestic demand remaining unfulfilled.
  - The timber industry will continue to rely on few timber species (40) for export, although domestic preference for lesser-used species will increase due to the unavailability of the prime species on the market. Ghana will maintain its share of the global market through increased export of lumber with a steady growth in the export of tertiary wood products.

- **Forest administration:**
  - As part of the on-going institutional reforms, the Forest Services Division would be streamlined but it will remain inefficient and not accountable. The attitude of the personnel will remain business-minded. The FSD would be constrained by a lack of adequate resources and efficient personnel drive. The Forestry Commission would not be accountable to its clients leading to loss of confidence in the Commission.
  - The next government after the Rawlings era did not have enough political will to implement the major forest policies that were initiated about a decade management. The multi-million dollar donor funded Natural Resources Management Program was discontinued due to ineffective management of the program and withdrawal of donor funds. Ghana lost the opportunity of consolidating sustainable forest management systems.
  - The promotion of value-added production was constrained by lack of skilled labour, inadequate supply of raw material and lack of marketing expertise in mills. The introduction of lesser-used species into the world market through further processed downstream wood did not make any significant impact because of the absence of exquisite and good quality furniture and moulding experts.

### 3.3.2 Scenario 2: SUSTAINABLE GHANA

The sustainable Ghana scenario requires that the supply of forest resources should be adequate to meet current and future demand of forest resources whiles maintaining the forest integrity. This calls for a reorganization of production and consumption to maximize the welfare of the people.

Under this scenario the biological richness and complexity of Ghana’s tropical forest was restored through judicious utilization of the forest resources. Ghana adopted a new forest policy that changed the consumption behavior and transformed the sector technologically. The forestry was transformed from predominantly secondary (saw milling, veneer milling and ply
milling) activities into a relatively large value-added tertiary sector. The timber industry was downsized through fiscal instruments, which enabled the timber industry to develop the efficiency of its processing capacity.

There was a tremendous growth in the forestry sector and the annual growth rate would increase sharply from the present low level of 1.9% to 6% in accordance with the projections under the Ghana VISION 2020. The forest sector remained the third most important foreign exchange earner contributing to about 30% of export earning and 12% of the GDP.

Investment and development in the wood industry was directed towards value-added processing which triggered off modernization in the timber industry. The total employment in the wood industry increased from 100,000 (1998) to 250,000 by 2020 whiles the sector continued to support the livelihood of about 3.0 million people. Export of wood products contained predominantly value-added products that enhanced Ghana’s share of the international commodity market by over 10%.

The organizational capacity of the forest administration was re-established under the new Forestry Commission to allow for adequate manpower and financial capacities to address all aspects of forest management and development. The reorganised forest administration was therefore able to restore the integrity of the forest estate and expanded the forest resource base through restoration and maintenance. The forest authorities were able to apply the laws and involved stakeholders in forest management and promoted transparency in forest administration.

The forest estates both reserved and off reserve were brought under sustained yield management. Management plans, setting up broad guidelines on the management objectives and detailed activities to achieve the management objectives, were prepared to guide management and utilization of resources. Illegal logging operations were brought under control through collaborative forest management practices.

The pressure on the natural forest was reduced through a combination of measures shifting from timber production of a few species to one that allows for a variety of goods and services, which ensures the development of more profitable forestry programs and leads to a greater participation of local communities. Management strategies therefore concentrated on improving the regeneration and growth of timber and non-timber forest products.

Intensive timber plantation using fast growing exotic and indigenous timber species was promoted by both the state agencies and the private sector. Tax relief on private planted forest areas and special insurance schemes against forest fires and blight were introduced as incentives to boost investment in plantation. By 2020 over 500,000 ha of degraded forestlands had been planted and the annual yield was over 2.5 million m³.

The AAC was brought in line with the annual growth rates in both natural and planted forests. The AAC was therefore brought in line with the installed milling capacity and harvesting of species was also brought within sustainable levels.

Deforestation rates were brought under minimal control as agriculture was modernized and bushfires were minimized. Surface mining continued but was effective monitored and controlled. All degraded mining areas were restored through effective planting of fast growing species.
Ghana introduced a forest certification scheme and a log tracking system, which was managed by independent bodies in the private sector. Production of timber from both natural and planted forests was obtained from certified sources. This contributed immensely towards sustainable forest management in the country.

Forest stumpages were revised to be as close to the real value of the wood. Ghana adopted a pricing policy, which favoured the protection of highly threatened species and encouraged all forms of processed wood export. The administrative inefficiencies of the forest authorities improved and the FSD was able to generate enough revenue to support its forest operations and administrative expenses without government subsidies and external supports.

- **Summary of impact of Scenario 2:**
  - **Resource base:**
    - The integrity of the forest resource base would be kept. Both the on and off-forest reserves would be covered by management plans and the entire 8.7 million ha of forestland would be under sustainable forest management. Harvesting controls would be effective to ensure ecologically and silviculturally accepted logging practices.
    - Through the effective investment and development, the size of timber plantations will increase from the present 70,000 ha to 500,000 ha.
  - **Exploitation of Species:**
    - All the exploitable species would be within sustainable harvesting limits. Effective log quality control methods would be used to control harvesting of trees.
  - **Annual Allowable Cut:**
    - The sustainable management of the natural resource base is likely to increase the AAC by at least 25%. The AAC from the planted forest will be twice the present AAC from the natural forest.
  - **Biodiversity:**
    - Biodiversity is a vital resource because it is the gateway to better and faster supplies of matter and energy to humans. Under this scenario, biodiversity would be maintained to help relieve human suffering and to decrease environmental destruction. This is likely to minimize the rate of change of the forests.

- **Underlying Assumptions:**
  - **Economic Policy:**
    - Ghana will continue to pursue structural adjustment program with priorities on achieving sustained macroeconomic stability, providing increased support for the private sector, development of economic infrastructure, promotion of made in Ghana products in support of agricultural and industrial employment and increased investment in the wood industry.
✓ The forestry sector would be expected to be the third most important export earner, generating timber export earnings up to US$ 500 million by the year 2020 US$ 1,000 million by the year 2020, an increase of 500% over the present export earnings

✓ Liberalization of trade and payment systems will enable entrepreneurs to transact international trade. Government will continue to tighten its fiscal and monetary policies to curb inflationary pressure and regulate the exchange rates. The slide of the Cedi will slow, but the continued low prices for the export commodities and the substantial current-account deficit will maintain the downward pressure on the currency

✓ Investment policy and fiscal incentives will favour investment in the tertiary value-added wood-processing sector. Fiscal policies would be used to regulate the timber industry

✓ Government will continue its infrastructure development program and new investment in roads and other infrastructure development. However Environmental Impact Assessment would guide these activities

- Agriculture:

  ✓ The cocoa industry would be modernized and yields per hectare will increase. This will not create much expansion in the industry and encroachment on forest reserves would be minimal. Food production will increase through improved productivity and sustainable land use practices, minimizing the shifting cultivation practices. Annual bushfires will be brought under control

- Population:

  ✓ The population policy was pursued vigorously to ensure a decline in fertility and fecundity rates thus keeping the population growth rates down to 1.5% as stated under the targets of Ghana Vision 2020. The reduced population explosion exerted little pressure on the forests thereby promoting natural regeneration of degraded forestlands

- Forestry:

  ✓ The forest sector will continue to pursue programs that will promote sustainable forest management and there will be enough resources to support the strategy. However the emphasis on raw material sources shifted from the natural to planted forests. Indeed about 30% of the AAC was obtained from the planted forests. The wood industry will continue to be export-oriented exporting mainly value-added products. Domestic demand will be fulfilled through value-addition

  ✓ Lesser-used species would be promoted to diversify the species base of the industry. Ghana will maintain its share of the global market through increased export of value-added products

- Forest administration:

  ✓ The Forestry Commission will decentralize to make the forest institutions more autonomous and efficient operating in business-like environment. All the Divisions of the Commission will operate with greater autonomy and
would be able to generate its own revenue to support its operation. The headquarters of the Forestry Commission became efficient monitoring units supervising the implementation of forest policies by the Divisions.

✓ The Natural Resources Management Program will achieve its objectives; natural resources would be brought under sustainable management.

3.4 PROJECTED DEMAND FOR WOOD AND WOOD PRODUCTS

3.4.1 Wood Export Demand

According to the International Tropical Timber Organization (ITTO) sources, global demand for wood products is projected to increase from present levels by an average of 2.6% for sawn wood, 5% for panels and 3.2% for paper and paper board to the year 2010. Ghana's share of global tropical timber is only about 2.2%. The maintenance of Ghana’s share on the overseas market is dependent on the capability of the timber industry to produce quality tertiary or value-added wood products and, more importantly, wood products from sustainable sources as demanded by overseas markets.

To maintain Ghana’s 2.2% share of tropical wood exports, it will require a 1.57-million m$^3$ equivalent of logs without expansion in the secondary production base. This means that all the AAC of 1.2 million m$^3$ plus 0.57 million m$^3$ would be needed in order not to jeopardize the sustainable management principles. This situation cannot be met under Scenario 1 but can be met under Scenario 2.

3.4.2 Projected Domestic Demand for Wood and Wood Products

In the last section it was established that most of the domestic demand for lumber products are unfilled leading to an increase in illegal harvesting of timber. This section makes a projection of the domestic demand for lumber by year 2020 based on population growth rates and a projected economic growth rate as contained in the long-term development objectives of Ghana VISION 2020. The objective is to estimate the volume of logs that would be extracted by 2020 and its implication on the sustainable management of forest resources in Ghana. For purposes of this study, the major domestic users of wood products were analysed including the following:

- **Housing and Construction:**

  Using the current timber utilization as a guide, the volume of wood consumed by this sector can be analysed as follows: A typical house of 60 m$^3$ requires 9 m$^3$ of timber for windows, doors, roofing and flooring. The average housing delivery rate is about 4 units per year for every 1,000 people. The total wood requirement for 1994 was, therefore, 522,000 m$^3$ or a per capita consumption of 0.036 m$^3$. Under Scenario 1, Ghana’s population growth rate is between 2.6% and 3.1%, indicating that Ghana’s population will double to around 33 million in the year 2020. Assuming no change in the per capita consumption of wood for housing, then the total annual wood requirement by year 2020 will be 1.116 million m$^3$.

- **Transport and Service sectors:**

  The transport and service sector consumes wood in various forms. These include hardwoods used as rail sleepers, lumber for building mummy trucks and trolleys and road construction.
It was estimated that the transport sector consumes about 1% of the wood available to the domestic market every year. According to the Ghana Vision 2020 document, the Service sector will achieve annual rate of growth of over 9% and the sector’s share of the GDP will be 35% to 43%. Assuming a proportionate growth in the consumption of wood products, it could be estimated that the total volume of annual wood demand for the sector would be 13,000 m³.

- **Fishing:**
The local fishing industry thrives on wood for the construction of canoes and boats. According to the Forest Services Division about 10% of felling permits were granted to the small-scale canoe carvers to harvest and process timber are given to the local canoe carvers association. This means about 1,000 m³ of wood are processed annually to manufacture boats and canoes. Given that the fishing industry will grow by 12.5%, it could be estimated that, the annual demand for wood products in this sector will grow to 22,600 m³ by the year 2020.

- **Art and Craft:**
The cottage wood processing industry utilizes wood for various purposes. Wood is processed to provide for kitchen cooking utensils, crafts for export and indoor decorations, etc. The volume of wood used by this sub sector is not known, but it could be estimated that about 0.3% of the annual domestic wood consumption may have been used for these activities. Assuming a future growth rate as manufacturing sector, the annual demand for wood by 2020 will be 2,000 m³.

- **Energy and Power Industry:**
The power transmission poles in the country rely on treated round woods. The current Government’s rural electrification project is dependent on the supply of treated teak. The total annual teak consumption is estimated at 300,000 m³. According to the Government’s rural electrification program, the demand for teak poles by 2020 will increase by 15%. Thus the total demand for wood for electricity would be 345,000 m3.

- **Mining:**
The shaft mining operations rely on round log to support the prob. Most of the mining companies rely on own-source teak plantation for the supply of timber. It is, therefore, difficult to estimate actual wood consumption by this sub sector. The national plantation development strategy estimated that currently about 30,000 m³ of timber is being used in the mining industry. Given that the mining sector will grow by 10% annually by 2020, then the total annual demand for timber could be estimated at 63,000 m³.

### Table 3: Summary of the log demand scenario in the country:

<table>
<thead>
<tr>
<th>Use</th>
<th>Requested volume (million m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing and construction</td>
<td>1.116</td>
</tr>
<tr>
<td>Transport and Service sectors</td>
<td>0.013</td>
</tr>
<tr>
<td>Fishing</td>
<td>0.023</td>
</tr>
<tr>
<td>Art and Craft</td>
<td>0.002</td>
</tr>
<tr>
<td>Energy and Power</td>
<td>0.345</td>
</tr>
<tr>
<td>Mining</td>
<td>0.063</td>
</tr>
<tr>
<td>Total</td>
<td>1.563</td>
</tr>
<tr>
<td>------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Total Demand for log</td>
<td>2,513,754 m³/yr.</td>
</tr>
<tr>
<td>Annual Allowable Cut (AAC)</td>
<td>1.2</td>
</tr>
<tr>
<td>Log Demand Deficit</td>
<td>1.3</td>
</tr>
<tr>
<td>= 150% AAC</td>
<td></td>
</tr>
</tbody>
</table>

Local consumption of wood products shows a rising trend. By 2020 the total domestic requirement of lumber would be 1.517 million m³ round wood, equivalent to over 2.15 million m³, assuming a recovery rate of 40%.

Aggregating the export and domestic demands, the total future demand for round wood is equivalent to 3.35 million m³.

Under Scenario 1, the AAC from the natural forest by 2020 can satisfy only 30% of the total wood requirement. The timber industry may have to resort to the harvesting of undersized logs to satisfy the installed capacity. The industry is to be a net-importer of timber raw materials if the present installed capacity is maintained.

Under Scenario 2 however, aside from the 1 million m³ from the natural forest, the 200,000 ha of plantation forest that would have been established will yield an additional 2.5 million m³ assuming 12.5 m³/ha/year. Under the scenario 2 therefore, there would more than enough round wood to meet the domestic and foreign markets.

4. RECOMMENDATIONS FOR FUTURE DEVELOPMENT OF THE FORESTRY SECTOR

Analysis of the future forestry outlook has demonstrated that the sustainable development scenario is the best path of future development for Ghana. The sustainable Ghana scenario however requires that the supply of forest resources should be adequate to meet current and future demand of forest resources whiles maintaining the forest integrity. This calls for reorganization of production and consumption patterns to maximize the welfare of the people. The scenario therefore has a lot of implications on policy and planning of sustainable forest management regimes in Ghana.

Fundamental to the sustainable forest scenario are the following:
- Effective forest management administration policy review
- Increased investment in natural forest management
- Effective stakeholder participation in forest management
- Incentives for production of value-added processing
- Intensive forest plantation development
- Forest Policy Research development.

4.1 LONG-TERM RECOMMENDATIONS

4.1.1 Effective forest management administration and policy review
The first and foremost priority to promote sustainable forest management is to re-establish the organizational capacity of the Forestry Commission (FC) to make forest authorities more responsive to the management of the forest estate. The newly established FC should consider empowering its divisions to become more autonomous and efficient. The headquarters of the Forestry Commission should concern itself with monitoring whiles the Divisions concentrate the technical issues.

The FC should seek collaboration with other sectors of the national economy whose activities impinges on the forestry sector. The country should develop integrated and collaborative programs to avoid undue pressure on the forest resource base.

Having reorganized the forest institutions, the next option is for the Ministry of Lands and Forestry to review forest policies to reflect on sustainable forest management practices. The new policy should consider:

- Adopting stumpage fees close to the real value of wood
- Introducing pricing policies which favors the protection of highly threatened species
- Adopting direct fiscal policies to down size the milling industry and encourage efficiency and recovery rates

4.1.2 Increased Investment in Natural Forest Management

Investment in forestry is an input into protection and sustainable management of forest resources. It is evidenced that even if the FSD were able to collect the full stumpage it would not be enough to meet the full cost of forest management. The public sector may have to supplement. Public funding especially for forestry research will continue to decline compared to private investment.

The Forestry Commission will have to seek investment from two broad sources namely internal and external forestry funds. The internal fund should arise from revenue generated from harvesting, processing and trade of forest products. The FC should divest itself of certain activities which the private sector can perform with more efficiency and thereby reduce its cost of operation. The external sources of investment should come from such arrangements as grants, which might be used to intervene in the timber market.

The FC would have to develop attractive investment policies, which encourage the private sector to invest in natural forest management. This calls for proper valuation of forest products and measures of economic welfare, which require efficient databases covering the direct and indirect uses of the forests.

To promote efficient forest management the following needs immediate attention:

- Harmonisation of the Information Systems of the Forest Services Division and the Forest Product Inspection Bureau is crucial to ensure effective billing and revenue mobilization
- Stock inventory data to be collected electronically using HHCs. The resulting GIS will be a valuable tool in managing the forest resource
- Calculation of stumpage should be based on the yield stock maps, using tree diameter as an indicator of volume. Such a system would avoid the use of TIFs altogether. Documentation carried in transit should be accompanied of a list of the numbers of the bar-coded tags of the logs.
4.1.3 Effective Stakeholder Participation

The extent of forest degradation is so widespread that the forest authorities alone cannot rehabilitate them. It should therefore be high on the national forestry development agenda to involve all stakeholders in forest rehabilitation and management. Various incentive packages should be developed to assist stakeholder’s involvement in forest management.

Promoting stakeholder involvement in forest management calls for a holistic approach to building capacity for forest management. Conscious efforts should be made to assist the private sector to develop the capacities they need for forest management.

Current approach to promoting community involvement in forest management would have to be reviewed to develop the capacity of the developing partners.

4.1.4 Incentives for the Production of Value Added Product

To encourage industry to move towards value added production and export, a number of incentives schemes should be put in place. For example, to encourage the utilization and processing of the lesser-used species (LUS), concessionary royalties and tax levels should be granted. Additionally, for companies that utilize and process LUS for export, there should be a waiver on the payment of export levies. Other incentives should include a reduction in corporate tax rates for timber companies that process non-traditional wood products made from LUS, training of personnel at all levels, management, supervisors, artisans and operators. Special programs should be developed to reduce waste and ensure residue utilization. A program to encourage product and species diversification should be launched with emphasis on promoting investment in rotary veneer, plywood moldings and other downstream products made most from Pink Star species.

The Wood Industry Training Institute should be upgraded to provide the needed skilled manpower for the industry. External fund should be sought to acquire the basic equipment and personnel needed to develop the manpower.

4.1.5 Improved Quality Assurance System Development of Timber Products Certification Procedures

This should aim at bringing Ghana in tune with international market demands for certification and eco-labelling of timber products. Using the new forest management systems as a foundation, a Quality Forest Management Standard for Ghana’s forest management systems both on and off reserve has been prepared. This Standard will be used as a basis for applying for certification of Ghana’s forests as sustainably managed.

The forest certification scheme should be fully promoted to enable Ghana to produce from a sustainable managed forest base. The introduction of forest certification will add cost to forest management so the private sector would have to be motivated with tax incentives to enable them to practice the forest certification scheme.

4.1.6 Intensive Forest Plantation Development
The future of the wood industry lies in plantation development. The current strategy of promoting investments in the plantation development through the private should be reviewed. The forest authorities have very limited control on the private sector. This means that investment in timber plantations cannot be guaranteed. The public should therefore seek external grants to invest in timber plantations to which the private sector will supplement.

4.2 IMMEDIATE RECOMMENDATIONS

4.2.1 Securing the Resource Base

In view of the current state of the forest the following strategies are being recommended to supplement the current policies to make Ghana more sustainable:

- Promoting Community involvement in forest management:
  - The Forest Services Division should develop workable systems with communities to define communal roles and responsibilities in resource inventory and management, yield allocation, mapping and monitoring of the utilisation systems. This requires training of selected individuals and groups within the communities in resource inventory, preparation of management plans, yield allocations and monitoring the utilisation of the resources and identifying what the communities can do with regards to the management of each resource.
  - The District Assemblies in collaboration with Information Services Department and the Forest Services Division should embark on intensive public education to create awareness and also get communities involved in management of forest resources.
  - The Forest Services Division should assist the District Environmental Management Committees (DEMCs) to develop and implement indicators and standards to monitor changes in the environment and to track logging activities in the region. The training will require a dialogue between the forestry sector and other sectors of the regional economy in order to emphasize on sectoral issues and impacts, to harmonize sectoral policies and actions for the harmonization of other planning activities that influence forestry activities.
  - The FSD should assist the DAs to develop adequate consultations with women’s groups to ensure full participation of women in resource management.
  - The FSD should train farmers in the new felling controls for logging on farms to allow farmers to monitor (and indeed veto) logging on their farms.
  - There is the need to introduce new elements in the participatory process—participatory inquiry, communication/information and education campaigns, round table and special committees must have greater impact. Non-governmental Organizations and local governments should be involved to improve the process.

4.2.2 Controlling Illegal Harvesting of timber

The scenario indicates that that the activities of illegal timber harvesting will be on the ascendancy. The following are recommended:

- The FSD in collaboration with the Information Services Department should embark on intensive public education on the new harvesting procedures, which give a farmer the right to veto felling of trees on his or her farm. A list of concessionaires
operating in the areas, a map showing the location of the concession and property marks should be made accessible to the local communities by the Forest Services Division and DAs.

- Forest Services Division in collaboration with DAs should form, train and equip local communities to monitor timber felling, processing institute and conveyance of logs/lumber to market. Part of the money paid to the task force for arresting illegal operators should be used to maintain the group

- DAs working through the Forest Services Division, Traditional Authorities and Timber Concessionaires should establish a Timber Trust Fund to provide an avenue for the timber industry to contribute to the cost of restocking on farms and community lands

4.2.3 Operational Guidelines For Fire Management

Considering the incidence and detrimental effects of bushfires to forest resources in the country, there is the need to prepare guidelines and a manual of operation for preventing and controlling bushfires at district and community levels.

4.2.4 Community-Based Land Use Planning

To improve on the unsustainable farming practices in the region, which is contributing to deforestation in the country, there is the need to develop and implement sustainable land use planning in the region. The following are recommended:

- The District Assemblies (DAs) should assist the Survey Department, Land Title Registry (LTR) and Town and Country Planning to embark on the registration of all titles to lands by enacting byelaws, which will compel landowner, families and stools to register all lands with Lands Commission for Title Deeds.

- The DAs acting through the Regional Coordinating Councils and in consultation with the Regional House of Chiefs should assist Traditional Authorities to harmonise all land allocation procedures and land tenure and security systems in region

- DAs in collaboration with interested NGOs should build up capacities of local communities to develop local standards to monitor incompatible local land use and ensure correction. This involves introducing participatory land use planning methods at community levels to develop sustainable land use plans

4.2.5 Improving upon the Livelihood of the Rural Communities

Poverty coupled with increasing population was identified as one of the main underlying causes of environmental degradation in the country. Due to limited disposable incomes, farmers are not able to practice intensive agricultural practices leading to loss of soil fertility and decline in productivity. Poverty has also drawn the youth into illegal harvesting of timber, which contributes to deforestation and loss of biodiversity. To solve the problem of poverty in the region the following are recommended:

- The farmers, women’s groups and the unemployed youth should be introduced to snail farming, bee keeping, and mushroom production

- Set up Business Advisory Boards in all the district capitals and operate revolving funds to assist small enterprises. This will reduce the dependence of the people on the forest resources
• Part of the timber royalties payable to the District Assemblies and the stools should be used to mitigate the negative effects of exploitation at areas that are badly affected. This requires that money accruing from royalties are used to develop communal infrastructures which will assist in improving their standards of living.

The solution to the degrading resource base lies in Intensive Timber Plantation Establishment. The Plantation development funds should be made available to both private and public institutions to invest. Degrade forest areas should be made available to plant.

5. CONCLUSION

A strive towards sustainable Ghana by the year 2020 should be promoted with maximum care as this paper comes to demonstrate. Historically, forest management planning has always recognized the multiple functions of forests, but with coming into force of equity in the environmental space, the political significance of forest management objectives other than sustained or increasing timber yield per hectare may have greatly increased. To ensure, “good forest management”, under the Sustainable Ghana, it requires that:

• Adverse environmental impacts associated with forest use must be minimized
• Sustained yields of removed forest products must be secured
• Legal and customary rights to land and forest products must be secured
• Cultural and religious traditions related to forest areas must be respected
• The economic net that benefits from forest use must be subject to a “reasonable” distribution
Appendix 1

**Box 2  Log Requirement For Domestic Processing**

The study on the Supply of Sawn timber for local processing has indicated that there are about 104 active sawmills and 26 bush mills throughout the country. Their combined capacity totals 1,320,404 m³ in terms of log input, with most of the sawmills running on a - two (2) eight-hour shifts per day- system.

Veneer and ply mills have capacities total 390,000 m³ on a - two (2) eight-hour shifts- per day base (TEDB). Their log requirements could go up by an additional 20% - 30% if they were to run on three (3) shifts per day, which hopefully would be the situation in the immediate future as the economy improves.

Therefore, the industry's current annual requirement may be estimated at 1,710,400 m³ but has the potential to reach 2 million m³ if all primary/secondary processing mills (sawmills, veneer mills and ply mills) run on three (3) eight-hour shift per day.

It is also estimated that illegal chainsaw operators are responsible for an additional 803,350 m³ annually, which are Sawn timber requirements.

Thus, the total industrial log requirement for the local processing may be estimated at least 2.5 million m³ annually. This is 150% more than the prescribed Annual Allowance Cut of 1 million m³.

The above scenario indicates clearly that the timber industry is presently characterized by excess capacity in terms of log requirement vis-à-vis the Annual Allowance Cut that will ensure the sustainable utilization of the timber resource.

How much of Ghana’s forest will remain in the year 2020 assuming there are no great changes in present policy?

In order to give a quantitative description of the deforestation process in Ghana, Anderson and Ortsin (1996) developed a regression model to estimate the future size of the intact forest area. Using this model as a proxy, the future size of the intact forest is estimated under this study.

**Box 3  Multiple regression model for predicting future size of intact forest cover in Ghana**

The model assumed that the relationship is linear and the equation is defined as:

\[ Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + c_i \]

Where \( Y \) is the level of intact forest cover, 
\( b_0 \)  a constant value; 
\( X_1 \)  Administrative efficiency of the Forest Services Division, which is measured by the ratio of the total stumpage collected against the potential stumpage that ought to have been collected over the period under review.
\( X_2 \)  Net forest revenue collected. This is the difference between revenue collected by the Forest Services Division and the expenditure they incurred during each financial year for the period under review.
\( X_3 \)  Total national population. As the population increases, pressure is put on the forest resources as people struggle to make ends meet.
\( X_4 \)  Literacy level. This is based on the axiom that the higher the level of education, the lesser is the degree of deforestation since the elite are always aware of the consequences of deforestation.
\( X_5 \)  Reforested lands. This relates to the total area that has been successfully put under afforestation either through enrichment planting or artificial regeneration.
\( X_6 \)  Forest offences: During each year people are arrested for the violation of forest laws and regulations. The level of forest offences is a direct measure of the efficiency of government policies in dealing with the problem of deforestation.
\( X_7 \)  Timber production. This measures the extent to which logging operations contribute to deforestation.
\( X_8 \)  Fuel and charcoal production. Demand for fuel wood puts a stress on the forest and is considered as one of the contributory factors of deforestation.
\( X_9 \)  Net national per capita income is a measure of the relative poverty of the population. It is said that the level of income determines how people utilize the natural resource.
\( X_{10} \)  Volume of log exports. This is a measure of the extent to which the forest resources are being creamed for export.
\( X_{11} \)  Forest area destroyed by bush fire. Bush fire has become an annual ritual and its effect is detrimental to the forest resources.
From the regression analysis, the model was defined as:

\[ Y = 971.2 + 0.194X_1 - 0.28X_2 + 511.8X_3 + 0.052X_4 + 0.299X_5 + 0.236X_6 + 0.136X_7 + 1.39X_8 + 0.577X_9 - 23.1X_{10} - 2.824X_{11} - 0.559X_{12} + e_i \]
Awards:
Under the concessions system this was discretionary. The 1994 Policy advocated a move to award of timber rights on the basis of competitive (financial) bidding, following pre-qualification. This principle was discarded by Cabinet following intense lobbying by the indigenous timber companies who argued that financial bidding would allow foreign (essentially Lebanese) companies to obtain access to “their” resources. The new Act provides for award through a hazy (non financial) competitive procedure based on the applicant proposals for provision of social amenities and reforestation.

TUC System Key Features - 2

Identification of TUC areas:
Inside forest reserves, the Forest Services Division identifies TUC areas. Areas suitable for timber production are the residual areas of healthy forest remaining after protection has been provided for. The areas are identified in the forest reserve management plans. Outside reserves, the FD identifies well-stocked potential TUC areas in consultation with landowners who have right of veto.

Limitations on end use:
Earlier insistence on processing capacity has been dropped. Contracts will be awarded to both loggers and logger/millers. The Minister has the right to direct TUC holders to supply the domestic market.

Assignment:
Transfer of rights in timber granted under a TUC is forbidden without the written consent of the Minister (to put an end to informal third party arrangements which allow concession holders to sit back and collect substantial rents from bonafide processors who didn’t have access to a resource).

Conditions:
- Prompt payment of fees
- Periodic review of operations by the Forest Services Division
- Adherence to the Forest Services Division’s Logging Manual and other prescriptions
- Preparation of a 5 year plan of operations and an annual logging plan
- Reforestation – 10 ha for every square km of contract area
- Provision of social amenities for local communities
- Payment of a deposit – 30% of estimated annual stumpage in advance of harvesting

Social Responsibility Agreements:
The Social Responsibility Agreement is attached to the TUC as an Annex. It allows the local resource owning communities to negotiate some of the conditions under which the contractor will operate, specifically a code of conduct and provision of social obligations. It is long overdue off reserve, where logging is often obstructed by farmers, who are angered by the destruction of crops and village infrastructure.

Environmental issues:
The TUC grants the holder the right of access to the Contract Area only – protected areas of reserves are off-limits. Within the TUC area the contractor is required to operate in an
environmentally sound manner in accordance with the Forest Services Division’s prescriptions for fine-grained protection.

Administration:
The Lands Commission previously administered concessions; this is an agency with no responsibility for the resource in future, award will be the task of a Timber Rights Evaluation Committee led by the Chief Conservator of Forests. The Committee will make recommendations to the Forestry Commission, the final award will be granted by the Minister. Within the new Forest Service the Operations Division (specifically the Contracts Manager) will be responsible for preparing contracts. At the resource level, the DFO and RFO will oversee implementation of the contracts. Since 1995 resource owning communities have been encouraged to monitor timber operations on farms. Through the social responsibility agreements and dissemination of general information on the new TUC system and improved revenue flows it is expected that the stool communities will be increasingly vigilant of illegal operations.

Suspension or termination:
For breach of any terms or conditions if the area is no longer suitable for operation under a TUC or/and if the TUC holder is convicted of an offence under this Act

Legal issues:
Timber Resource Management Act provides for TUCs and the Logging Manual (binding on the TUC holder) and Social Responsibility Agreements. Regulations to accompany the parent acts cover detailed terms and conditions. Contract assigns rights to a particular individual. Logging Manual specifies detailed code of conduct & felling procedures for logging operations. SRA specifies relationship with local people.

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**TUC System Key Features - 3**

**Social Responsibility Agreements (SRA) for Timber Utilisation Contracts**

A working group defined the basic objectives and principles of Social Responsibility Agreements, established by the Forest Services Division comprising timber contractors, stool chiefs, community representatives and farmers. The terms are negotiated locally and included as Annex 4.

Objective:
The SRA is a mechanism for ensuring that all TUC operations are carried out in a socially responsible manner with respect for the rights of the resource owning communities. Its secondary purpose is to ensure the contractor can operate without hindrance or obstruction as long as the terms are kept.

Negotiation:
The terms of the SRA are negotiated between the Forest Services Division and the resource owning communities prior to the advertisement of the TUC area. The actual agreement is entered between the successful TUC applicant and the stool chiefs concerned.

Code of Conduct:
Each SRA will vary depending on local conditions, however all are expected to contain a code of conduct for operations. The code of conduct ensures that operations are conducted with respect for local customs, beliefs, infrastructure and livelihoods. On reserve it is recognised that timber production is the primary objective in the TUC area and the code may be limited to issues concerning respect for:

- Cultural norms such as taboo days
- Rights of access to forest products for domestic use
- Timely consultation concerning location of logging roads etc
- Timely payments
- Local infrastructure

Outside reserves, the primary land use is agriculture, the code of conduct may be concerned with a wider range of issues such as respect for:

- Farming operations
- Cultural norms
- Local rights to NTFPs
- Consultation during planning of operations
- Local infrastructure
- Compensation for crop damage
- Right of farmers to receive a payment for tree tending

Social Obligations:
Traditionally contractors have often been expected to make goodwill gestures locally, the social obligations will specify the agreed direct support the contract will provide to local development initiatives. This requirement will be reviewed in the future if other returns to communities (i.e. revenue flows) are deemed to have substantially increased.

The social obligations are negotiated between the Forest Services Division and the communities. The DFO ensures the requests are reasonable and for the benefit of the community at large. The law limits the assistance required to not more than 5% of the annual royalty accruing from operations in the area. Likely forms of support are:

- Materials or cash for development projects e.g. new schools
- Provision of lumber for community projects
- Employment of local labour