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IMPACT OF INCREASED UTILISATION OF LESSER-USED SPECIES (LUS)

(CAMEROON REPORT)

by

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CHAPTER ONE
INTRODUCTION

1.1 Timber Exploitation

Tropical forests of Africa are composed of a large number of species in a complex mix, many of which are non-commercial. These features tend to make profitable logging and sustained yield management difficult to attain (FAO 1993). At present only about 7% of trees in the tropical forests are being exploited. For example, in Cameroun 86% of timber harvested is from 15 species out of 56 commercially exploitable species (Evans 1990). The restriction of exports to a relatively small number of species may be attributed to the fact that most importers from industrialised countries are reluctant to import lesser-known species from Africa. This is probably due to the availability of adequate supplies of the more established species from a variety of West African countries (ITTO 1991).

Efforts are being made to utilise more species for both local and export markets. Governments of most tropical African countries are thus encouraging their timber industries to expand the species base in order to increase net revenue from the forestry sub-sector of the economy (TEDB undated). Increased utilisation of a wide number of species, especially lesser-used species (LUS)\(^1\), will prevent creaming of the few traditional high value species; cater for increasing local demand and ensure sustained production and supply of timber. Presently, many of the LUS are being burnt or otherwise wasted after logging in the reserved

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\(^1\) LUS are timber tree species which show promising market potential. Such species tend to be characterised by:
- Flexibility in fitting today's rapidly changing markets i.e. the distribution and exploitable volume of the species are sufficient for market interest.
- (Often) strategically positioned as a substitute to prime commercial species and thus are potentially of high value. However, most of these species may have one or more undesirable characteristics (which may or may not be possible to overcome through improved processing techniques).
- A species for which marketing opportunities arise due to greater processing options, and thus a bulk market, relatively low value species, possibly in competition with plantation production.
forests and conversion of forest lands into agricultural use in off-reserve areas. There is the need to initiate programmes aimed at the sustained utilisation of LUS especially in countries where logging volumes or yield are low (Yeom 1984). Logging volume and therefore the extent of logging disturbance can be effectively controlled by implementing log production quotas which has been determined based on the concept of sustainability.

1.2 Rationale for LUS Study

There have been a number of studies into the effects of increased intensity of timber harvest from tropical forests but none has considered LUS extraction separately (Rietbergen & Poore 1995). Thus it is difficult to draw definitive conclusions on the ecological, social and economic impacts of increased harvest of LUS alone. However, it is possible to explore the effects of increased LUS utilisation on the grounds of basic silvicultural reasoning such as:

- Increased utilisation will result in heavier harvesting which may lead to over-exploitation and increased damage to the forest stand. A longer than desired felling cycle may have to be used to restore the forest.
- Alternatively, an increase in LUS utilisation may help open the canopy and promote faster growth in forests with low harvesting intensity

Generally, ensuring that LUS are exploited without jeopardising the integrity of the forest ecosystem remains a challenge to foresters and conservationists.

A major objective of the International Tropical Timber Agreement (1983) is diversification of trade in timber species. The importance of species diversification is also emphasised in ITTO's Action Plans with specific strategy elements in each of the fields of Forest Industry, Reforestation and Forest Management and Economic Information and Market Intelligence. Accordingly, the ITTO has directly addressed the issue of species diversification through projects and pre-projects which involve the use of LUS.
Therefore, ITTO Project PD 33/95 was drawn up in order to be able to address "information gaps" on the environmental, silvicultural and socio-economic impacts of increased LUS harvesting. This report is the output of a study visit to Cameroon.

The objectives of this Cameroon country study report are:

- To identify the complexities and variations in LUS utilisation
- To collect information on the extent to which LUS utilisation has contributed to total production and replaced over-exploitation of a few currently traded species
- To assess the extent to which LUS utilisation has contributed to or detracted from sustainable management of forests.
- To determine the impacts of increased LUS utilisation

1.3 Characteristics of Study Site

1.3.1 Land Area

The total land area of Cameroun is approximately 475,440 km². The country lies between latitudes 2° and 13°N and between longitudes 8° and 16°E. It is located between West and Central Africa, bounded to the West by Nigeria and the Atlantic Ocean, to the North by Chad, to the East by Central African Republic and to the South by Equatorial Guinea, Gabon and Congo (Gartlan undated).

The country had a total population of 11.1 million people and an annual population growth rate of 2.6% in 1988. Population density varies from 90-100 persons km⁻¹ in the West and Littoral Provinces to only 5 persons km⁻¹ in some savannah and moist forest areas. Approximately 60% of the population live in rural areas (Foaham and Jonkers 1992).
1.3.2 Climate and Vegetation

The vegetation of the country is discussed comprehensively by Letouzey (1985) and Gartlan (undated). The vegetation is closely related to the rainfall distribution. The amount, duration and regularity of rain increases from the Northern to the Southern parts of the country. The wetter parts of the country is covered mostly by tropical moist forest, while the drier parts have Steppes and Savannahs (IRSC 1974). The tropical moist forests consists of three major types, namely; Evergreen Rain Forests, Semi-Deciduous Forests and Mangrove Forests.

The Evergreen Rain Forests have mean annual rainfall ranging between 2000 and 3000 mm, except for the mountainous areas where mean annual precipitation can exceed 10,000 mm. Where the evergreen rain forests are intact, very large trees with diameter at breast height (DBH) of up to 4 m and tree heights of up to 25 m are fairly common. These forests are rich in Caesalpinaceae (Foaham and Jonkers 1992). Primary production of the Evergreen Forests are estimated at between 200 and 300 m³ ha⁻¹.

The Semi-Deciduous Forests which are rich in Sterculiaceae and Ulmaceae are located to the east of the Evergreen forests. The Evergreen and Semi-Deciduous Forests are subject to an equatorial climate with four seasons per year (long and short wet and dry seasons).

Mangroves are most extensive in the deltas of the large rivers where the vigour of the sea surf are broken by sand banks. They also occur in small bays and lagoons, where soils are brackish, between high and low tide marks. The most common mangrove species is Rhizophora racemosa which grows up to 25 m and makes up almost 95% of the mangrove area (Gartlan undated). Other mangrove species are R. harrisonii, R. mangle, Avicennia germinans (syn. A. Africana and A. nitida) and Laguncularia racemosa. These species generally form a dense tangle and grow to heights of 10 m (Dykstra et al. 1996).
1.3.3 Biodiversity

Cameroun has a high biological diversity (Morton 1972, Gartlan 1989) due to the ancient and stable systems, particularly in the lowland coastal forests (Gartlan undated) and is related to the high ecological (habitat and micro-habitat) diversity (Foaham and Jonkers 1992). Cameroun also has the second largest biodiversity resources in Africa after Madagascar. There are 9000 species of plants in the country, with at least 156 endemics, including 45 on Mount Cameroun alone. It is estimated that between 12 and 13% of the estimated 6,500 flowering plant species in Cameroun are endemic. The forests of South Cameroun are described as a Pleistocene refugia for forest flora and fauna (Hamilton 1983, Maley 1989, (c.f. Foaham and Jonkers 1992)).

About 48% of the endemic plant species of West Africa are also found in the country. Cameroun has about 297 species of mammals and 848 species of birds (Stuart et al. 1990). Faunal diversity has also been described in detail by several authors (Stuart 1986, Kingdon 1990, Gartlan undated). The main threats to biodiversity are deforestation, logging, shifting cultivation, collection of non-timber forest products (NTFPs) and plantation forestry (Foaham and Jonkers 1992).
CHAPTER TWO
FOREST RESOURCES AND EXPLOITATION

2.1 Total Forest Cover

The total forest cover is estimated to be 22.5 million hectares (about 46% of the national territorial area) which is the second largest in Africa after the Democratic Republic of Congo (formerly known as Zaire). About 80% of the forest area accounting for 37.6% of the total land area can be classified as productive forests (Eba’a Atyi 1998). Almost 45% of the productive forests have so far been opened up for exploitation, while 39% and 16% of the area are reserved and preserved for biodiversity respectively.

Three hundred tree species have been identified as having potentials to be exploited as timber. However, only about 49 tree species are officially recognised as being commercial. Only about 15 of these species are regularly exploited and make up for more than 80% of the total wood volume produced annually. Of these only three species (Triplochiton scleroxylon, Entandrophragma cylindricum and Lophira alata) account for almost 60% of production (Wehiong 1990).

The annual rate of decline in the natural forest area of Cameroun in the decade after 1980 is estimated at 122,000 ha (0.9%), while that of Ghana is estimated at 138,000 ha., Nigeria at 119,000 ha., Liberia at 25,000 ha. and Sierra-Leone at 12,000 ha. (FAO 1995). The high population growth rate and poor agricultural practices (Shifting Cultivation) and forest fires are the major causes of forest degradation and destruction.
2.2 Policy, Legislation and Tenure

2.2.1 Policy

The exploitation of forests in the West African sub-region, including Cameroun, dates back to the 16th Century (Hall and Swaine 1981). However, it was not until the early 1940’s that the operations of the timber industry came under strict official controls. Between 1940 and 1970, a series of policy decisions were made which were aimed at improving harvesting techniques and reducing logging waste. The system of controls includes the detailed reporting of felling and transport of logs (Foaham and Jonkers 1992).

There was a rapid rise in timber harvests in the 1970’s and 1980’s. According to Gartlan (undated), this was due to the diminishing petroleum resource and falling world prices which combined to put pressure on the forestry sector to make good the difference. The Government formulated and implemented a number of strategies in the early 1990’s to ensure that the activities of the expanding forestry sector were effectively controlled (FAO 1995). A Ministry of Environment and Forests (MINEF) was created in 1992 to formulate policies that would ensure sustainable forest management. Institutional re-organisation was done by merging the two major implementing institutions in the forestry sector. The Centre National de Developpement Forestier (CENADEFOR) and the Office National de Reboisement Forestier (ONAREF) were merged to form an organisation named National Office for Forestry Development (ONADEF).

A new forest policy was formulated between 1993 and 1994 and formed the basis for Law No. 04/01 of 1994 to regulate forest exploitation, wildlife and fisheries resources. The policy is aimed at mobilising the full potential of the forestry sector to produce 4 million m³ of sawlogs and 9 million m³ of firewood per annum. The policy also aims at ensuring that timber exploitation is done sustainably. In order to achieve this objective, the new policy lays down clear

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2 MINEF has four divisions, namely: Forest, Wildlife, Environment and Administration divisions. The total workforce of MINEF is 2,000.
objectives and strategies which is summarised by MINEF and ONADEF (1994) as follows:

Objective I: To ensure the protection of its forest heritage and to participate in safeguarding the environment and preserving biodiversity.

Strategies: Creation of permanent forest estates, development of protective measures and integration of policy formulation and development.

Objective II: To improve the integration of forest resources in rural development

Strategies: Promotion of participatory forest management, improvement of sectoral and inter-sectoral co-ordination of peoples participation, promote development of private forestry and development of agro-forestry in agrarian system.

Objective III: To ensure the sustainable development of forest resources

Strategies: Increase the supply of timber and non-timber forest products (NTFPs), improve forest exploitation and revenue generation systems and promote the use and diversification of finished products

Objective IV: To revitalise the forest sector by setting up an efficient institutional framework

Strategies: Improve the organisation and co-ordination of forest sector institutions, encourage human resource development through training, monitoring and evaluation.

One of the most important aspects of the new forest policy is that it guarantees customary usage rights of forest resources. This is regarded as being an essential pre-requisite for securing the rights and livelihoods of farmers and villagers (Schmithusen 1986). Different degrees of usage rights are guaranteed depending on the type of forest. Land usage rights may generally be exercised freely in accordance with traditions and customs on un-reserved lands. However, rights of individuals and local communities are likely to be restricted in quantity and quality on permanent forest estates.
2.2.2 Forest Legislation

The purpose of forest legislation is to ensure the conservation, exploitation and development of forest resources. Forest legislation of Cameroun therefore offers a broad framework for the utilisation and management of forest resources based on a multiple use concept (Schmithusen 1986).

The first unified law was promulgated in 1974. This law included provisions related to national park establishment, hunting, wildfire and fisheries management. The Forestry Code of 1974 was revised in 1981 and completed by the Application Decree in 1983 (Schmithusen 1986). The revised law was more comprehensive than the former one with regard to forest management and timber allocation procedures. The 1981 forest law defines several categories of forest lands and potential utilisations allowed for each category. The regulations governing the logging industry, including allocation of concessions, harvesting controls, revenue generation and taxation were also enshrined in the law.

A new forest law was promulgated in 1994 to replace the earlier one of 1981. The new Forestry Law No. 94/01 of 1994 was supported by a Decree of Application No. 95/531/PM of 1995. The law stipulates that 20% of the national territory is to be reserved as permanent forest estate. It further defines different types of forests and their respective ownership. According to Eba’a Atyi (1998), the 1994 forest law stipulates that logging activities should be regulated by an official accreditation in the logging profession and the acquisition of exploitation rights.
2.3 Forest Management

2.3.1 Selection System

The selection system is the main forest management tool in Cameroun. The system involves commercial logging with or without regeneration or silvicultural treatment. Selective logging involves the removal of single economic tree species scattered throughout the forest. Under the Selection System of management, the forest is divided into a number of more or less equal coupes and concession areas for ease of logging and control of exploitation. The coupes are of size 2,500 ha. while the concessions are large areas (up to 200,000 ha.) consisting of a number of coupes. The forest management system ensures that management plans are drawn for concession areas before exploitation. This is to ensure that concessions are managed sustainably. However, coupes are not required to have management plans of their own since the area is considered too small to be managed separately. The management of coupes are therefore integrated with those of the broad concessions area.

The annual felling takes place in one or more coupes depending on the capacity of the logging operator or concessionaire, the length of the felling cycle and the area of production forest. The Ministry of Environment and Forests (MINEF) is responsible for determining the number of coupes that should be exploited within the felling cycle. The forest management system allows for the advertisement and public auction of trees above the girth limit in the coupes and concessions. Once the coupes earmarked for exploitation have been advertised, concessionaires are given 40 days within which they can submit their application. Ten copies of the application form including official identification, technical capability of the company and the financial offer per unit coupe are submitted to MINEF. It is worth mentioning here that the minimum offer for each coupe is fixed by MINEF under relevant provisions of the Financial law.
An Inter-Ministerial Commission has been set up to evaluate the bids, and to select the concessionaire who should be awarded the contract. The Inter-Ministerial Commission play only an advisory role since the law makes it clear that it is only the Minister of Environment and Forests acting on behalf of the president who has the authority to award timber contracts. The Inter-Ministerial Commission has on the other hand appointed an eight member technical committee to open the bids and assess the technical and financial suitability of the applicants using a points systems. The technical committee meets twice a year under the chairmanship of the sector minister.

According to Eba’a Atyi (1998), two types of rights are granted to the contractors after advertising and competitive bidding. The first type of rights is that of “Sales of standing volumes (vente de coupe)” which can be small tracts of land (no more than 2,500 ha.) or a given volume of standing timber. Sales of standing volumes within both the permanent and non-permanent forest estates can be granted only to Camerounians. Concessions on the other hand are large tracts of forest land covering up to 200,000 ha within the permanent forest estate which are granted to both foreigners and Cameroun nationals.

As pointed out by the Tropical Forestry Action Plan, there is currently no managed forest, which represents a very serious problem for the future and the perpetuation of the forests.

2.3.2 Institutional Aspects

Institutional structures that have been established to manage forest and wildlife resources are hierarchical. Implementation of forest policy and management strategies are done at the national level by MINEF. Institutional control of forest management also occurs at the provincial, divisional, sub-divisional and district levels. There are 10 Provinces in the country which are divided into a number of divisions and sub-divisions. The sub-divisions are further divided into a number of districts depending on how big the sub-division is.
Within each of the 10 Provinces, there is a Provincial Delegation responsible for forestry and wildlife management. Delegations have also been set up at the Divisional level. These Divisional Delegates directly report to the Provincial Delegates. Sub-divisional and District levels however have forestry and wildlife posts. The closest forestry official to the forest who is in charge of the day to day control of timber exploitation is the Chief of Posts. Forest boundary maintenance, enforcement of logging regulations and protection are some of the activities that are supervised by the Chief of Posts.

2.3.3 Forest Inventory

The management of the forest resources in Cameroun has for a long time employed various field surveys (inventories) to determine the growing stock within individual forest reserves. Four different types of forest inventories, namely; national, management, pre-Investment and harvesting are carried out periodically in accordance with the broad objectives drawn up under the forest policy.

National Inventory: The objective of the national inventory is to know the resources level, especially that of LUS, for national level planning. The national forest inventory was started in 1981 and currently, about 14 million ha. out of the total forest area of 20 million ha. have been inventoried. The national inventory uses a 0.1% sampling intensity due to the large coverage area.

The results of the national inventory provided the basis for the formulation of the 1994 forest policy and law. A number of strategies and policy decisions aimed at ensuring sustainable forest management have been drawn up using the national inventory results.

Management Inventory: The purpose of this inventory is to enable forest managers draw up effective forest management plans for concession areas. A 1% sampling intensity is used during Management Inventory. So far about three
million hectares of forests have been inventoried under this system for private contractors.

In some cases a Pre-Investment Inventory is requested by private contractors during the Management Inventory. A pre-investment harvesting is done to help contractors know the potential stocking and value of a particular forest area. This information enables private contractors to make a decision as to whether to bid for a particular area.

**Harvesting Inventory:** This is a field survey that is conducted on timber exploitation within the coupe or production area. The harvesting inventory is preceded by a stock survey during which a 100% count of all exploitable commercial timber species with minimum dbh of 30 cm are made. The concessionaire is allowed to exploit all trees above the girth limit or basal area per unit area prescribed by the management plans for the given forest. Harvesting inventory has been done systematically on 60,000 ha. of forests for private contractors.

**Post-Exploitation Inventory:** This type of inventory is done after timber exploitation. It includes an assessment of disturbance, tree damage and regeneration following timber exploitation.

### 2.3.4 Local Community Participation in Timber Management

Land and the tree resources belong to the state. Therefore, the local communities in Cameroon have comparatively lower rights to forest resources than communities in Ghana where the land and forest resources belong to the local communities. However, Government policy is aimed at ensuring greater participation of local communities in forest management. This is because the extent of degradation in the country is so high that MINEF alone cannot prevent forest degradation due to inadequate staffing strengths. It is only with the active participation of the local community that sustainable forest management can be achieved. The Government believes that the well-being of local communities is intricately linked with how well forest resources are managed and that community
participation is important if a cost effective, efficient and sustainable forest management programme is to be developed.

According to Dykstra et al. (1996), local communities are the major and direct consumers of the goods and services and therefore should be involved in forest management. The 1994 Forest Policy and Law seems to adequately identify and address the issue of local community participation. However, its implementation has not been very effective due to the slow development of structures and the lack of resources necessary to implement the strategies. The benefits of community participation in forest management are reduced costs to the government, generation of income and employment within the local communities and better maintenance, protection and exploitation of natural forest resources, especially NTFP.

In order to ensure that local communities benefit from timber exploitation, the Government has instituted a social amenity contract between private contractors and local communities. An amount of 1000 CFA are paid per cubic meter of timber by private contractors to a fund which are later disbursed to the communities.

Previously, farmers could convert forest land into agriculture with impunity, whereas they could not harvest a tree on the agricultural land for conversion into timber. However, at present individuals and local communities are permitted on basis of contract to harvest single trees for personal use.

2.4 Timber Harvesting Practices and Controls

2.4.1 Harvesting Practices

The national inventory indicated that there is about 2 billion m$^3$ of exploitable timber within the productive forests. The average annual production stands at 2.3 million m$^3$ of timber (MINEF and ONADEF 1994). However, the production target of the government is 4.0 million m$^3$ by the year 2000 and 5 million m$^3$ by the year 2010. The exploitation rate is currently low with up to 3 trees per ha. being
removed. A number of measures have been put in place to increase the harvest intensity. These include a broadening of the exploited species base to include LUS and a reduction in residue generation.

According to Gartlan (undated), concessions had been granted on at least 8 million ha. by 1992. This is more than half the land area officially classified as exploitable. About 50% of production forests have been logged at least once while some areas have been logged three or four times. Logging activities in natural forests occur only in five provinces. However, more than 57% of timber products harvested in Cameroun are from the East Province (Eba’a Atyi 1998).

2.4.2 Harvesting Controls

According to Evans (1990), logging controls are strictly enforced and the penalty for flouting of logging regulations are quite severe. Logging in Cameroun has been regulated by restrictions on girth limits for most trees and efficient log tracking systems from the forest to the mill gate.

The application of a girth limit has been considered as one of the useful timber production control tools applicable to both reserved and off-reserve forests. Minimum felling limits are supposed to define the point of maturity of various species suitable for timber and other uses, allowing for the removal of only mature trees. Silviculturally, the effect of applying a felling limit is that it allows the residual stand to be composed mainly of productive trees (i.e. trees that are vigorously growing). Consequently the basal area or volume stocking increases over the period of the felling cycle, and the production of viable seeds is enhanced, thus ensuring adequate natural regeneration. The girth limits vary with species from 100 cm for the most logged, and decreases down to 50 cm dbh for species that are not well known (Besong 1992). In Ghana and Nigeria the minimum felling limit ranges between 70 and 110 cm dbh (Dykstra et al. 1996).

Log tracking procedure as a measure of harvest control is outlined by Department of Forestry (DF) Form 10. It is the responsibility of the timber
contractor to make sure that the logs and stumps from any felled tree are appropriately marked. The marks include the date of felling, coupe number, licence number, province, division and zone (which is based on the distance from port of export). The contractor is expected to file returns using DF Form 10 to the Divisional Delegation at the end of each month. Felling tax and customs duty to be paid by the contractor are calculated by officials of MINEF based on information from the filed returns of the DF Form 10. Information from DF Form 10 are cross-checked with information collected by the Provincial Delegation.

Another harvesting control is that of the issuance of way bills to trucks carrying logs and timber products. The waybills contain information on the volume of each log and details of the characteristics of the log including type of species.
CHAPTER THREE
STRUCTURE AND EFFICIENCY OF THE TIMBER INDUSTRY

3.1 Structure and Development

The logging industry is under the effective control of foreign companies, even though the number of industries owned by foreigners are fewer than that of nationals. Seventy-three percent of registered logging companies are owned by Camerounian nationals, while 22% are foreign enterprises and the rest have mixed capital (Eba’a Atyi 1998). However, the total of area of productive forests exploited by Camerounian nationals (12,000 km²) in 1987 was 20% of that of foreigners (Garlan undated). According to Eba’a Atyi (1998), not all the registered industries are active. Only 48% of locally owned and 60% of foreign-owned industries are active. This further indicates that the foreign enterprises are much more successful in the timber industry.

About 2.3 million m³ of timber was produced in 1990/1991, while 2.81 million m³ were produced in the 1995/96 fiscal year. The forest regulation of 1974 stipulates that at least 60% of all timber harvested should be processed locally (Schmithusen 1979). However, only 38% of the total amount of timber produced was processed locally and 23% was sold on the domestic market (Direction des Forets 1992). This indicates that the timber industry is export oriented. According to Willan et al. (1989) the dependence of the timber industry on the export market with its emphasis on high quality and extreme selectivity has led to the virtual stagnation of the domestic wood markets in the tropical moist African Region. Government policy is currently aimed at strengthening the processing sector and increasing the percentage of locally processed wood by 100% by the year 2000.
In spite of the low level of wood sold on the domestic market, the percentage of locally processed wood sold on the domestic market in Cameroun (77%) is considerably higher than that of the other countries in Central Africa. This is probably because the forest sector is not competitive internationally due to inefficient mill operations (Wehiong 1990), lack of a timber marketing board which promotes and markets wood products internationally (Willan et al. 1989). Other factors contributing to the relatively low percentage of exported wood products are strict regulations, incomplete knowledge of the resource and insufficient road and port infrastructure (Foaham and Jonkers 1992).

The total capacity of industries in the forest sector is over 3.2 million m³. However, the total log production is about 2.8 million m³, representing 89% of the total requirements of the logging industry. However, the log supply situation in Cameroun is better than a lot of countries in the West/Central African sub-region, including Ghana, Nigeria, Cote d'Ivoire, Central African Republic, etc. where log supply is on average less than 50% of the total installed capacity of the timber industry.

The 1981 and 1994 forestry laws have set variable taxes and fees for processed and unprocessed wood in order to encourage secondary and tertiary processing. However, in spite of these taxes, the export market is largely dependent on logs due largely to the relatively high capital and operational costs involved in log processing compared to log exports. According to Gillis (1988) the dependence of the industry on log exports may be due to the fact that the net induced value added through processing is lower than the loss of taxes. It is clearly more profitable to export logs rather than sawn timber with regard to the overall financial spin-offs for the country (Foaham and Jonkers 1992). There is therefore the need for a review of the taxation and forest royalty systems to make the industry more efficient. The necessary policy mechanisms should also be formulated in addition to the re-tooling of the timber industry to ensure more downstream processing.
3.2 Production Capacity

There are a total of 61 primary wood processing enterprises (Wehiong 1990). These enterprises include 50 sawmills, 7 veneer factories and 4 plymills. Of the 61 primary processing companies, about 60% belong foreign investors and 7% are joint ventures between foreigners and nationals (Eba'a Atyi 1998).

According to (Eba'a Atyi 1998), the total installed capacity of these 61 primary processing units amounts to almost 2 million m$^3$ of roundwood. However, only about 1.55 million m$^3$ of logs, which is about 78% of the installed capacity, has on average been processed. According to Willan et al. (1989), many of these mills work at 50% capacity because of inefficiencies associated with high logging residue generation resulting from the lack of skilled staff and the use of obsolete machinery. This indicates that there is an over-capacity of the timber industry.

The 1994 forest policy and law has set a target of processing 70% of total log production by local enterprises. However, currently only 55% of logs are processed locally. Thus, the actual volume processed is both below the nominal capacity of established firms and the forest policy targets. The domestic market accounts for about 30% of the total log production. All the domestic consumption is as processed products, mainly lumber, plywood and matches. These products are mostly of lower quality and cannot be exported (Eba'a Atyi 1998).

3.3 Efficiency of Timber Industry

The average recovery of timber from raw logs for export is 30%, but can be as low as 20%. Furthermore it is estimated that as much as 20-35% of each felled tree is lost at the logging site. As a result the waste from felled tree to sawn product is as high as 65-75% (Gartlan undated). The average recovery rate of the sawmills is 35%, the plywood and veneer processing is 57%. The high level of processing waste is probably due to the fact that most of the good quality logs are exported while the poor quality ones are transformed locally. Other reasons
for the low recovery include obsolete machinery, lack of skilled workers and lack of standardisation for transformed products (Wehiong 1990).

3.4 Contribution of Timber to the National Economy

Cameroun is currently the seventh largest exporter of tropical timber in the world and the third in Africa after Cote d'Ivoire and Gabon. Timber is the third largest foreign exchange earner after oil and agriculture and accounted for 4.0% of Gross Domestic Product (GDP) in 1980 (Gillis 1988). The percentage contribution of the timber industry to the Gross National Product (GNP) has increased from 3.5% in 1989/1990 to 6.7% for the 1995/1996 fiscal year (Eba'a Atyi 1998). The contribution of the forestry sector to the national economy is far greater than the figures quoted above due to the fact that a large part of the production of forest resources other than timber are not accounted for in the national accounts.

Forest products (including logs, lumber and panels) accounted for 11% of total exports in the 1970's (FAO 1986) and 20% in the 1990's (Eba'a Atyi 1998). The total value of timber exports in the 1995/1996 fiscal year amounted to US$321.1 million. The amount of timber produced locally has also been increasing steadily. For example, about 30% of all timber produced were processed locally in 1992 (Foaham and Jonkers 1992) whilst 55.3% of the total amount of timber, representing 1.254 million m³, were processed locally in 1998. Almost 30% of the timber export expressed as log volume equivalent is processed locally.

The forestry sector provided direct employment for about 3,500 people in 1973 and 33,000 people in 1998, equivalent to 7% of the total labour force (Wehiong 1990). Work in the timber industry is labour intensive, and therefore labourers account for over 90% of the work force in the timber industry. Thirty-one percent of the labour force are in the harvesting sector and the rest are in the forest-based industries.
As a contribution to government revenues, the logging industry provides income through felling taxes (based on market values of the different timber species), area based taxes, miscellaneous (including penalties and special permit) and export taxes. The first three type of taxes are collected by Direction des Forets while the latter is collected by the Customs Department. Taxes collected by the government from the logging industry increased from US$18.4 million in 1992/1993 to US$59.2 million in the 1995/1996 fiscal year which represents a relative contribution of 4.4% of government revenues (c.f. Eba’a Atyi 1998).
CHAPTER FOUR

EXPLOITATION AND MANAGEMENT OF LESSER USED SPECIES

4.1 Definition and Characteristics of Lesser Used Species

4.1.1 Definition

The terms Lesser Used Species, Lesser Known Species (LKS) and Secondary Species are often used interchangeably in the literature and within the timber trade. As far as the timber trade is concerned, the definition of such species is essentially a negative one: it covers all species that are not part of the limited group of “traditional timber species” that have been traded internationally in large volumes over many years (c.f. Carter 1998). However, in practice the terms have slightly different connotations. LUS is used more as a marketing definition, while LKS often implies a general lack of knowledge about the ecology, characteristics and management of the species. The use of the term secondary species on the other hand denotes species with interesting characteristics but the marketing of which, either as logs/sawn timber or as semi-finished/finished products, is as yet not or little developed in one or more countries (Parant 1990).

There seem to be no fixed definition of LUS or LCDS. However, in Ghana the LUS is defined jointly by the Timber Export Development Board (TEDB) and Forest Products Inspection Bureau (FPIB) of Ghana as “any timber species which is not endangered and has not been restricted in any form and which on its own merit has interesting characteristics/qualities or has the potential to substitute the traditionally known/primary species, but whose average annual level of production, over the last three years, in terms of extraction and export does not exceed 5,000 m$^3$ and 2,000 m$^3$ respectively. According to ITTO (1991), an LUS is any species that has on average a level of 1000 m$^3$ of wood traded
per year. More than 60% of species in Cameroun are listed as irregular market species or LUS (Wehiong 1990).

4.1.2 Some Characteristics of Lesser Used Species

4.1.2.1 Small Sizes and Poor Form of Trees

Mature trees of some species attain relatively small diameter at breast height (DBH). Such species are difficult to saw, especially if they also have a high sapwood:heartwood ratio. For most of these species there is the need for a re-tooling of the industry, since the industry is used to sawing large diameter logs, to be able to process them.

Another characteristic of LUS is poor bole form of most of the mature trees. This results in a low recovery rate, thus making such species unattractive for logging by the timber industry.

4.1.2.2 Durability and Preservation

Many species remain unused for the sole reason that they are not durable and, in many countries, people will go to great expense to obtain a high grade, durable wood to build their house rather than accepting a lower cost timber treated with preservative. The cost of pressure treatment with a preservative is seldom more than 20-25% of the price of the cheaper wood and, therefore, the total price is normally considerable lower than that of the durable wood. Treatment is very effective, for example, treated stakes of non-durable species have lasted for more than 30 years in the ground in tropical conditions (USDA 1989). Cameroun is currently building up the capacity to undertake large scale treatment of non-durable LUS.
4.1.2.3 Seasoning

Another major cause of failure to use LUS is inadequate drying; consequently the products made from them are faulty. The climate is generally humid and therefore it is difficult to air dry LUS timber below a moisture content of 16-20% even during dry seasons. It is, therefore, essential to kiln dry LUS timber to be used for furniture and joinery manufacture, if a quality product is to be obtained.

4.2 Exploitation and Utilisation of Lesser Used Species

The African timber trade accounts for around 8 percent of the total world timber trade by volume. The export trade is dominated by a relatively limited number of highly prized timber species which generally have a widespread natural distribution. In the 1970s, Africa exported around 35 principal species with 10 accounting for 70 percent of the total trade (Erfurth and Rusche 1976). Increasing efforts have been made to diversify the trade hence an increase in the logging and harvesting of new species or species currently described as LUS.

Assuring the future supply of tropical timber products from sustainably managed forests is one of the most critical challenges facing the tropical timber sector in both producing and consuming countries today. Market-oriented harvesting caused the tropical timber supply to concentrate on relatively few species. Forest management, as a result, was induced to limit growth to a small number of economically viable species. In such a situation, the objective of biological diversity and conservation in a truly sustainable system was difficult to attain.

Within this framework, a long-term programme to stimulate and promote the production, utilisation, and trade of lesser-known timber species on a sustainable basis has been developed. The introduction of lesser known species is desirable for a number of reasons. It will substantially diminish the risk of depletion of a relatively small group of species. In addition, obtaining a greater yield of timber per hectare will slow down exploitation of forest areas. The
opportunity to exploit a greater number of species per hectare will increase royalty and foreign exchange revenues to producing countries.

Conventional wisdom holds that expanding the number of species utilised will help to ensure both the survival of the tropical timber trade and the forests on which it depends. More species imply more raw materials for the trade, leading to the promotion of biodiversity in utilisation.

4.3 Incentives for LUS Utilisation

There is the need for the government to put in place an effective incentive scheme to encourage the forest industry to exploit both LUS and primary species. Some of the incentives include the setting of royalties or forest fees for standing timber at a rate where it is equally profitable to cut, process and market primary species and LUS. This is currently difficult to achieve in Cameroun due to the fact that a detailed knowledge of production costs for the different species and revenue from different products is unknown.

Forest fees set up in the 1994 forest law is lower for LUS compared to primary species. This is designed to encourage the timber industry to exploit and process more LUS. Another approach that is being considered is to improve the technology used to process the wood so as to add value to low value timbers. The third approach that has received considerable attention is for the government to set up a Timber Marketing Board to be responsible for the marketing of the products and identify “niche” uses for previously low value timbers in order to obtain a higher value for them.
4.4 Promotion and Marketing of LUS

The promotion of LUS is a major government policy. This is because an increase in the utilisation of LUS is one of the ways in which the government hopes to use to achieve its 2000 objective of ensuring 5 million m$^3$ of log production in the country. In line with this objective, the government has mandated ONADEF to develop mechanisms for the effective promotion of LUS on the domestic and export markets.

A new law banning the export of round log exports comes into effect on 20 July 1998. This law is aimed at encouraging downstream processing which would lead to the processing of more LUS. In order to further encourage the exploitation of LUS, a few of these species will be allowed to be exported in round log form for a short time following the ban to encourage their exploitation, promotion and marketing. Lower taxes has also been instituted to encourage the processing and utilisation of LUS.

A framework for the promotion of LUS has been developed by the Direction des Forêts. These include a number of steps.

- The first step is to promote the knowledge of the ecology of individual species and resource base of the forest in general. The results of the inventory studies would be used in the promotion drive.
- Secondly, the properties of LUS would be studied. Based on the properties, the most appropriate uses of the species would be outline. The Government has set up a Wood Promotion Centre which is mandated to develop new products from LUS for marketing.
- Thirdly, the focus of LUS promotion would be by species groups, according to similarities in characteristics. The current method of promoting individual species is generally not a very effective means of promotion.
- Wood promotion on the domestic market is done by organising periodic fairs and wood shows.
There is no Government agency that deals with marketing of timber in the country. However, the 1994 Forest Law makes room for the creation of a National Timber Board which will be responsible for developing a marketing framework for the promotion of LUS. Currently, the Societe Generale Surveillance (SGS), control marketing and export quality.

Continuity of supply and continuity in the nominated markets are essential for the sustainable management of lesser used species of all tropical forests. The market prospects of many lesser used species have been the subject of considerable debate for some time (Bethel 1984). The traditional view that the marketability of new species will improve with scarcity -induced price increase for more popular species has been challenged by recent research. Vincent et al (1990) found that the proportion of Dipterocarp (which are well known in the trade) to non-Dipterocarp (which contribute to the list of LUS) logs imported by Japan remained statistically constant over an 18 year period unaffected by variations in price or available processing technologies.
CHAPTER FIVE
IMPACTS OF INCREASED UTILISATION OF LESSER USED SPECIES

5.1 Implications of Increased Utilisation of LUS

The increased harvesting of LUS may help prevent the creaming of the forest. However, this can only be achieved if trees are exploited in proportion to their natural occurrence in the forest. This can be done by incorporating spatial data in forest inventories to ensure that sufficient volumes of LUS exist in contiguous forest areas to make harvesting ecologically worthwhile.

Increased harvesting of LUS also has an effect on the socio-economic conditions of local communities. However, the extent of impact is not known. There is therefore an urgent need to understand, the ecological, social and economic, impacts of the promotion and increased utilisation of LUS in order to avoid irreversible damages that are associated with over exploitation of species.

5.2 Ecological Impact

Logging is an integral part of the management and silviculture of the forest in West Africa and its careful execution will assist in the sustainability of the forests for future timber. It is widely believed that one of the hindrances to sustainable forest management practices has been the destructive form of logging carried out in many operations (Arentz 1994). According to Putz (1994), logging is damaging, no matter how well planned and carefully implemented, but with proper planning and operational practices it need not greatly disrupt forest processes. Many of the reductions in logging damage characteristic of well managed forests are the results of careful harvest planning (Dykstra & Heinrich 1992). Increased harvesting of LUS if not carefully planned can lead to very open
forest canopies and cause a large amount of damage to the saplings and regeneration on the forest floor. (Whitmore, 1990).

Uncontrolled logging results in the removal of up to 2 trees ha\(^{-1}\) in Cameroun (Duiker and van Gemerden, 1989) and 3 trees ha\(^{-1}\) in Ghana (Agyeman et al., 1995) which affects up to 20% and 13% of the total area in Cameroun (Duiker and van Gemerden, 1989) and Ghana (Hawthorne, 1993; Agyeman et al., 1995) respectively. A higher logging disturbance was recorded in Cameroun compared to Ghana, even though less trees were removed, because of the larger diameters of the felled trees. For example, most of the trees felled in Cameroun were greater than 100 cm dbh whereas those felled in Ghana were above 70 cm dbh (Agyeman et al., 1995, Duiker and van Gemerden, 1989).

Timber harvesting inevitably leads to damage to vegetation and spoil, although measures can be taken to reduce such damage to a minimum (Hendrison, 1990). Duiker and Van Gemerden (1989) investigated the distribution of gaps and skid trails in part of the GWZ concession. They found that after a yield of 17.3m\(^3\)ha\(^{-1}\) (1.4 trees/ha), gaps occupied 14.2% of the area, and skid trails 6.4%. The spatial distribution of gaps and trails was distinctly uneven, however, and felling of groups of three or four trees occasionally led to very large gaps of almost one hectare. This is mainly a result of the ecological characteristics of the most important timber species, the Azobé, which is dependent for its regeneration on shifting cultivation fields and other large openings in the canopy (Letouzey, 1960; 1985) and tends to grow in even-aged clusters (c.f. Foaham and Jonkers 1992).

Timber harvesting not only affects the environment, it also stimulates the growth and regeneration of tree species (see also Maître, 1986a; 1986b). Duiker and Van Gemerden (1989) studied the regrowth in felling gaps about 18 years after exploitation, and on old skid trails. They found that the tree stand in small and medium-sized gaps accounted for 26% of commercial species. Large gaps (> 600m\(^2\)) were generally covered with climbers and regenerated poorly. Abundant regeneration of commercial species was also found on those parts of old skid
trails where the crawler tractor had turned over the top soil and mixed it with organic debris. Azobé regeneration was present on these disturbed soils, but was lacking in gaps and undisturbed parts of the forest. The compacted wheel tracks were almost without vegetation.

5.3 Socio-economic Impacts

Lesser Used Species make important contributions to the domestic economy. LUS are processed as charcoal for both domestic and commercial purposes. Local communities depend on LUS as fuelwood for cooking or as energy for small-scale local processing.

The reliance on wood as natural building and construction materials is the norm in most rural communities. Most of the LUS are traditionally used as construction materials for building houses and grain barns and as raw materials for carving essential kitchen utensils like spoons, baskets for food storage, grinders and domestic equipment like stools, wooden trays, hoe handles, toys and building of canoes. More than 65% of the households highly depend on these materials to satisfy their basic needs, while the rest (35%) depends on them as sources of employment and income.

Some LUS have medicinal properties and constitute essential components of health treatment of several rural communities. However the degree of dependency varies according to distance to the nearest health post, educational background, financial position and beliefs of the patient.

Increased commercialization of lesser used species has had both positive and negative effects on rural economies. Positive impacts include an increase in jobs and rural family income levels which are defined to include forest revenues, royalties, and raw materials supply. Other impacts are increased potential for participatory forest management by local communities. Negative impacts are threats to fragile habitats and increased access to forest resources leading to increased degradation of the forest environment.
REFERENCES


Hawthorne, W.D. 1993. Forest regeneration after logging. ODA Forestry Series No. 3.


APPENDIX 1

Individuals and Organisations who were visited and Interviewed in Cameroun by the Project Team

(1) SIMO Huber – Deputy Director of Otady
(2) Kede Otodo – directeur des Etudes.
(3) Tongo Bokamu Timothée- change d’Etudes No. 1
(4) Batoum Thémotuo – chef des Eaux et Forets (Attaché de Direction)
(5) S. A. B. (Smété Africane de Bois)
(6) Parfait Louis Ottou
(7) The Managing Director, R. C. Coron MRL (Sawmill)
(8) Mr. Wale Adeleuke WWF
(9) Tabi Philip Tako – Eta, Deputy Director of Forests. MINEF
(10) Foncham Godlove Fombum, Woodwork Technician at Lesser Used Centre of ONADEF
(11) Mr. P. Soglo Director General of ONADEF.