

HARVESTING CONTROLS IN SOME WEST AFRICAN COUNTRIES

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ABSTRACT

Since the state cannot undertake harvesting of timber resources alone, provisions have been made under allied legislation (Investment Codes) to encourage the participation of stakeholders in the timber trade in the West African sub-region. In order to encourage wise use of the timber resources, various legislative mandates have been introduced as controls over the years in response to changing socio-economic and ecological circumstances of the resources.

Accordingly with the development of forestry institutions, the scope of controls has been extended to embrace more pro-active forest conservation strategies currently endorsed by the international timber market.

Against the prevailing institutional and legal framework, conditions underlying the control systems have been identified and used as basis for a comparative review of harvesting controls in Ghana, Nigeria, Liberia and Cameroon. Additionally, existing controls governing chainsaw operations in Ghana and Nigeria have been compared.

Major obstacles constraining the enforcement of controls are lack of institutional co-operation, political pressures, poor logistics and the imposition of non-deterrent penalties for forest offences.

Key words: Timber harvesting, felling cycle, concessions, resource allocation.

INTRODUCTION

According to Ford-Robertson (1983), timber harvesting is the removal of financially or technically mature trees from the forest for utilisation. Timber harvesting therefore constitutes an integral part of silviculture and forest management systems. Generally, all wood based industries are dependent on the output of timber harvest for their supply of raw materials.

Notwithstanding this function, timber harvesting causes various forms of damage resulting in deforestation, soil degradation, wood waste, and damage to the residual stand.

Park (1992) observes that timber harvesting differs from other causes of deforestation by its ability to generate high economic returns in a short time. According to Rosevear, such lucra-

tive economic gains have continued during the boom years to attract "all manner of people who knew nothing whatsoever of the timber trade" (Adeyoku, 1971) to establish companies for timber harvesting and log export throughout the West African sub-region.

The consequences of such ventures was that by the close of the 70s, Ivory Coast and Nigeria have almost logged out their forests and have accordingly been listed among countries with critical level of deforestation. In Ghana, "the resource life" of *Pericopsis elata* which was introduced to the market after the Second World War was found to be threatened together with some of the traditional species (*Milicia excelsa* and *Entandrophragma spp.*) following the massive timber exploitation for export earnings (Alder 1989, Park 1992, Grainger 1993).

Appraising the timber trade and related government policies in West Africa sub-region, Reppetto and Gillis (1988) observed that "None of these countries has derived any tangible or intangible benefits from forest use to offset the many economic, social and ecological costs of rapid deforestation".

Timber Resource Base

Most of the timber resources in the West African sub-region are located in the tropical moist forest (TMF) extending from the coastal high forest of Sierra Leone through southern parts of Liberia, Ivory Coast, Ghana, Nigeria, Cameroon and parts of Gabon. According to Hall & Swaine (1981) the flora constitutes the Guineo-Congolian region with "three sub-centres of specific endemism". Each of these sub-centres (Upper Guinea, Lower Guinea and Congolian) has relatively distinctive homogenous flora, containing a number of endemic species requiring protection from logging and other forms of land use.

Environmental Pressures

Following the world-wide concern about environmental changes threatening the survival of the TMF, individual governments are increasingly becoming aware of the need to undertake measures to conserve this invaluable natural resource.

This trend has been encouraged by the realisation of governments, of the potential effects of loss of export revenue following the disappearance of the TMF. Another observation relates to the environmental conditions introduced as requirements for assistance by the World Bank and other international donor agencies. Against this background various environmental pressure groups are pressing hard for sanctions against tropical timber trade.

In response to these mounting pressures, several initiatives have been undertaken in the West African sub-region since the last decade to:

- establish a performance control system for stakeholders to whom various forest

utilisation contracts have been granted;

- create enabling environment for the sustainability of the tropical moist forest.

Stakeholders

Since the state cannot undertake harvesting of timber resources alone, provisions have been made under allied legislation (e.g. Investment Codes) to encourage the participation of stakeholders in the timber trade. The stakeholders involved in timber harvesting operations are:-

- a) Holders of various forest utilisation contracts:
 - Concession holders
 - Loggers
 - Sawmillers
 - Chainsaw Operators
 - Bush Millers
 - Pitsawyers
 - Landowners
 - Chiefs
 - Farmers
- b) Support services:
 - Hauling Rig Operators
 - Plant pool owners

Legal framework of timber harvesting

The legal framework governing timber harvesting in the West African countries is generally enshrined in relevant sections of forest legislation dealing with forest resource allocation. Under this section, the functions of public authority responsible for all aspects of forest utilisation are stated. In addition, provisions for exercising controls and checks in timber harvesting are outlined to give the granting authority a legal basis for its functions (Schmithuesen, 1986).

Granting Authority

Under the existing Forest Administration in West African sub-region, the right to harvest

timber is generally granted by the Forestry Department on behalf of the government to stakeholders as leases, concessions, licences, permits, timber harvesting contracts or agreements. With the acquisition of these titles, stakeholders employ labor and machinery to carry out various harvesting operations such as road construction, felling, extraction and finally evacuation of logs to clients. The rights granted to a stakeholder is restricted to a defined area and is valid over a defined period of time. In addition, provisions governing concessions with regard to logging practice, silvicultural treatment, tax and royalty collection differ from country to country and constitute the basis for upstream harvesting controls (Repetto and Gillis 1988).

Rights and conditions

According to an FAO definition, harvesting control means: "The organization of harvesting in an orderly and efficient manner, to ensure felling in accordance with planned system of annual coupes, with maximum use of felled trees and minimum damage to the rest of the forest" (FAO, 1989).

From the definition above, it can be said that the right to harvest timber resources requires that certain rules and regulations are observed to reduce all forms of negative impacts and ensure maximum benefits.

It can therefore be argued that the granting of the exclusive right to harvest timber is, in itself, a method of controlling harvesting of any useful resource like timber and consequently enjoins the stakeholder to certain contractual obligations complementary to sound harvesting practices.

Secondly, it also provides the opportunity for the granting authority to introduce various conditions to protect the resource from misuse. For example, rules embodying specific conditions can be introduced to determine how much of the resource can be allocated; when, how often this should be done and who should receive the allocation.

Another useful feature to observe is that it

enables the granting authority to react to changing circumstances of the resource by changing rules of operation, e.g., following the economic performance of the newly introduced species over the past two decades, a reclassification of the timber species was undertaken under the Forest Inventory Project (FIP) in 1988 to recognise species which have been exported from Ghana in the last 15 years. Through this exercise some lesser known species which have been vigorously promoted in the past have found their way to the FIP Class 1 group. In addition, a permit system has also been introduced to control the exploitation pressures on the threatened economic species. Another example in Ghana is the log export ban on fourteen timber species in 1979 to encourage local processing.

Legislative mandates, regulations, rules, and guidelines

Under the existing Forest Administration in the West African countries, various rules and regulations in form of conditions have been introduced to control and monitor harvesting operations. The first group of conditions are legislative mandates which result in fines and penalties on default, i.e. breach of felling limit or log marking prescriptions. These are basic harvesting regulations expected to be observed by all stakeholders with the aim of protecting the resource base and the trade in general.

The second group of conditions are general rules and guidelines which are difficult to control i.e. adoption of certain practices, such as rehabilitation of residual stands. Unless it is clearly stated, when, how and with what species, it is always difficult to tell when desired results have been achieved, since alternative practices such as planting exotic species, may be as equally acceptable as doing so with indigenous species.

The following provides an overview of standard conditions generally found in harvesting control systems:-

- Duration of the harvesting rights;
- area covered by the harvesting rights;
- inventory of resource;

harvestable material (volume, or number of trees, felling limits; basal area, type of species, classes).

frequency of harvesting (length of felling cycle);

site/location (restrictions and ecological considerations, slopes, wetland, and rivers).

harvesting plan/procedures (lay-out of roads, infrastructure development, felling rules, harvesting sequence).

machinery and equipment;

post-harvesting measures;

payment of forest fees (severance fees, royalties, ground rent, etc.);

participation of stakeholders in local development.

HARVESTING CONTROLS IN THE WEST AFRICAN SUB-REGION

Duration and area

The Forest Administration generally serves as the granting authority responsible for awarding various harvesting rights to stakeholders. The duration of concessions varies from 5 years in Cameroon for an area not exceeding 200,000 ha to 3-25 years in Ghana for areas less or more than 800 ha for licence and lease respectively. Currently, for management purposes, all the reserved areas in Ghana have been grouped into 52 Forest Management Units (FMUs). In order to enhance controls over timber harvesting, an optimum number of concessions for each FMU corresponding to 500km² has been recommended.

Pre-harvesting inventory

A pre-harvesting requirement throughout the West African sub-region is the inventory of the merchantable species over the prescribed felling limits in the proposed area of operation. This is

generally conducted at varying sampling intensities ranging from 5% in Liberia to 100% in Ghana. The inventory provides useful information on species composition, distribution and forest terrain condition required for the preparation of harvesting plans (road lay-out, log dumps, harvesting sequence etc.) and overall management plans for the area. The inventory results are mapped and presented with the stocking summary data. Currently, in addition to this information, seed trees of seriously threatened species (Scarlet Star) and rare species (Black Star) are required to be enumerated during the pre-harvest inventory in Ghana to enhance the control of yield allocation of the economic timber species approaching extinction.

Felling limits

In order to protect immature timber species from felling, forest legislation has prescribed minimum felling limits for timber harvesting throughout the West African sub-region. Felling limits prescriptions are species specific and vary from country to country. For example, the minimum felling limits of the primary species in Liberia and Nigeria are fixed at >40 cm and >50cm respectively. Cameroon and Ghana on the other hand, harvest the same species with higher felling limits namely: (65cm - 85cm) and (>70cm, >90cm and >110cm respectively (Table 1).

Felling cycle

A further control for the sustainability of the timber resource base depends on the frequency of harvesting. The felling cycle varies between 25 years in Liberia to 40 years in Ghana.

Apart from Ghana, which has extended its felling cycle from 25 years to 40 years after a 15 year Salvage Logging Period (SLP) (Nolan and Ghartey 1992) the general trend in the sub-region has been rather a progressive reduction of the felling cycle (Table 1). For example, before 1960, timber harvesting was controlled on area basis in Nigeria with a felling cycle of 100 years. However, following political pressures, and consequently, deterioration of controls, the felling cycle was reduced to 50 years and

Table 1: Harvesting Controls - A Comparative Overview

CONDITIONS	GHANA	NIGERIA	LIBERIA	CAMEROON
1. Granting Authority	Forestry Department (FD)	State Forestry Dept.	Forest Development Authority (FDA)	Ministry of Environment and Forest (MINEF)
2. Forest Resource Allocation	a) <i>Prior to 1957</i> Concession length: 50-99yrs. Ghanaians and Foreigners. b) <i>From 1974, Restrictions</i> Concession: Ghanaians only Licence 800ha, 3yrs Leases 800ha 5-25yrs. Felling Permits: 1-5 trees Property Mark c) <i>Concession system</i> , currently based on competitive bidding. <i>Trends</i> Forest Utilization Contract	Concession 25 yrs. Licence Permit Marking Hammer Property Mark	a) <i>Prior to 1973</i> No uniform concession agreement. b) <i>From 1973</i> Timber Concession Agreement, 1973: Uniform concession standards c) <i>Forest Exploitation Permit (public lands and outside concessions)</i> 5-10 Yrs. based on size 40,000 ha. Property Mark	a) Forest Exploitation Licences Area = 200,000 ha (Max) Validity; 5 Years renewable Marking hammer b) Harvesting Licence for State Corporation c) Communal Forests - Licence or sale by standing volume.
3. Felling Cycle	40 yrs. (15yrs SLP) (25yrs)	25 Yrs. (50 Yrs, 100 Yrs)	25 Yrs. (40 Yrs)	30 Yrs.
4. Pre-Harvest Inventory of Timber Resources	100% Enumeration of merchantable spp. d.b.h 30-50cm, >50cm Identification of Seed trees Permit spp/CITES Black Star (rare spp) Scarlet Star (eco. threatened spp)	Enumeration of merchantable spp. based on d.b. >50cm	Survey Permit (6 months) Permittee undertakes 5% sample Enumeration based on d.b.h >40cm.	Inventory based on girth limits in annual coupes. (logging units) by Logging Unit (assiette de coupe) renewable for 3 years
5. National Forest Inventory	Forest Inventory Project 1993 1.4 mil. ha. of THE	1983: Indicative High Forest Inventory	1960-1963 3.5 Mill ha.	14 million ha out of the 22 mill. ha. of Forest Estate inventoried in 1983
6. Check-Survey	10% Sample Enumeration	NO	NO	Forestry Staff
7. Yield Allocation	Based on d.b.h >70cm, >90cm, >110cm Yield formula Yield pre-determined and marked for concessionaires by Forestry staff	Based on OTV prior to 1981 After 1981 based on Area ".....there are no functioning working plans for high forest reserve "COLLAPSE of Systematic arrangement" (LOWE 1984).	Based on d.b.h., - Primary spp. > 40cm plus 30% for secondary spp. Yield prescriptions by FDA "Irrational exploitation forest sector is losing its credibility (KOFFA 1988)	Annual Coupe 2500 ha Based on d.b.h. (65cm - 85cm) Yield pre-determined and marked by Forestry staff in annual coupe(s).
8. Harvesting Plan	Management Plans - Road layout and infrastructural Development (Log Dumps, bridges) - Felling Plan	Management Plans	Management Plans Selective felling	Management Plans
9. Timber Production Control Agencies	a) Forestry Department b) Forest Products Inspection Bureau (FPB) c) Timber Export Development Board (TEDB) b + c = Control Export trade	State Forestry Department Federal Forestry Department	Forest Development Authority	a) ONADEF b) SGS
10. Site Protection Restrictions Ecological Consideration	Wetlands Slopes > 30% Water courses - 25m or 50m vegetation strip depending on size of river <u>Protection Strategy</u> - Fine grained protection - Large grained protection	Sacred/Medicine seed trees. Pollution of watersheds with sawdust and mill waste Fire	Sacred/Medicine/seed trees Pollution of watersheds Fire	Watersheds
11. Felling	3 Years to work the compartment	Annual coupes	Working coupes	Restricted to Annual coupe(s)
12. Post-Harvest Inspection	Yes	No	No	Yes, issuance of certificate for closure of coupe
13. Machinery restrictions	a) Tracked Tractors bigger than D6 caterpillar	No Restrictions	No Restrictions	No Restrictions
14. Reforestation Logged Area	Silvicultural fee	Forest Trust Fund	Silvicultural fee	ONADEF

subsequently to 25 years by the close of the 70s (Lowe 1984)

According to Arentz (1993) Liberia can sustain her timber resources on a 40 year felling cycle, Though officially, the felling cycle has been reduced without any apparent reasons to 25 years, in practice, a 12 year felling cycle or even shorter has been operational following the protracted political instability and the civil war.

This general trend in reduction in the length of felling cycle is an indication of the mounting pressures on the timber resources in the West African sub-region and the need for stricter controls

YIELD ALLOCATION

Based on the estimated Annual Allowable Cut (AAC) from national inventories, yield allocation is predetermined and marked accordingly by staff of the Forestry Administration for Stakeholders.

Nigeria

According to Lowe (1984) formerly, the stakeholders in Nigeria harvested all listed species above prescribed felling limits and paid on out-turn volume (OTV) as was practised in many places like in the Ondo State. The OTV system of yield allocation was replaced by payment according to the area of annual coupes, which unlike the former demanded less supervision and integrity of the field staff. Fellings were carried out according to the demand of individual species with permission to revisit previous coupes to harvest desirable species. However, this systematic arrangement collapsed following widespread organised illegal timber exploitation which the Forestry Administration could not control (Inkumogunnigi, 1980).

Cameroon

Out of the 22 million hectares of the national

forest estate of Cameroon, 14 million hectares have been covered by various inventories since 1983. It has been estimated that Cameroon has 2.0 billion m³ standing timber volume. Based on these findings, Cameroon intends increasing the Annual Allowable Cut from 2.3 mill m³/year to 4 million m³/year through increased utilisation of the lesser known species (ONADEF 1994, Baker et al. 1995).

For yield allocation, each concession is subdivided into an average size of 2500 ha logging units (assiette de coupe). Out of these logging units, a number is selected from a concession and enumerated each year by the Office National de Development de Forêts (ONADEF) and allocated to the Stakeholder for harvesting. A logging unit is opened for three years after which it cannot be worked and a certificate is duly issued to close it. With the allocated coupe(s), a Stakeholder may decide on how best to work the coupes. A nation-wide patrol unit under the Forestry Department undertakes regular inspections to ensure that timber harvesting is confined to the annual coupes allocated and previous closed coupes are not re-logged (Grut et al. 1991).

Ghana

In Ghana, the quantity of trees that can be harvested from a compartment on a sustainable basis annually is currently controlled by minimum felling limits prescriptions, a yield allocation formula, a 40 year felling cycle, and a fine and large grained protection strategy (Hawthorne and Abu-Juam, 1993 Forestry Department, 1995).

Based on the natural size and frequency distribution, appropriate felling limits have been prescribed for individual timber species, to avoid the risk of over-exploitation. Additionally, in order to control exploitation pressures, special permits are required for felling species with abnormal distribution e.g. *Milicia excelsa*, *Entandophragm* spp. etc.).

TABLE 2: A Comparative overview of Chainsaw operation in Ghana and Nigeria

CONDITIONS	GHANA	NIGERIA
1. Pre-harvest requirements	Pre-felling Inspection	No Pre-felling Inspection
a) Fees & Charges	Felling Permit Payment of Royalties Permit to be presented to Unit Committee at the location of tree	a) Permit from Forestry Dept. b) Payment of hammer fees. c) Permit from chief to enter forest. d) Payment of Interstate fees for lumber to other states
b) Felling Restrictions	a) 1- Tree District Forestry Officer 2-5 Trees Regional Forestry Officer > 5 Trees Chief Conservator Forest b) Protected Species	No Restrictions on number of trees. N 1200/Lorry Load.
2. Duration of Permit	a) Chainsaw Operators: 2 weeks b) Loggers: 2 weeks c) Canoe, Charcoal and Firewood Producers: 1 month	With the permit, operator can re-enter to fell and manufacture lumber provided the lorry load fee is paid.
3. Post-Harvest Control	Post-Harvest inspection to ascertain whether stumps and produce have been appropriately marked	No post-harvest inspection.
4. Evacuation of produce	Certificate of conveyance valid for 3 days is issued for logs, lumber, canoe, charcoal and fuelwood.	No permit of conveyance is required except Inter-state Lumber transport.
5. Chainsaw Registration	Under the Chainsaw Operation Regulation (LI1518) all chainsaws are to be registered with the District Assemblies.	No registration required.
6. Contribution to local Development	Community Projects	Community and social projects.

Yield allocation - standard formula

The yield allocation formula and its variant are currently applied to the stocking summary data from the pre-harvest inventory to calculate the number of individual tree species to be harvested in a compartment. The standard formula and its variants are:

$$\begin{aligned}
 Z &= 0.5Y + 0.2X. \quad (1) \\
 &\text{Standard formula} \\
 Z &= 0.25Y + 0.2X. \quad (2) \\
 &\text{Modified formula/Variant.} \\
 Z &= \text{number of trees to be removed above felling limits,} \\
 Y &= \text{number of trees above the felling limit,} \\
 X &= \text{number of trees in the diameter class immediately below the felling limits.}
 \end{aligned}$$

With its in-built retention and mortality factor, the formula and its variant provide for 40% retention of trees above the felling limits and a 20% mortality rate over a 40 year felling cycle (Forestry Department, 1995).

Modified Formula

A significant aspect of the formula is that it can be adjusted according to the protection requirements of a site or an area by applying the modified formula (2) to reduce yield allocation for ecologically sensitive areas, namely fire prone zones, dry semi-deciduous and degraded forests. Similarly the modified formula is applied to reduce yield of timber species approaching economic extinction in Ghana (Scarlet species) e.g. *Albizia ferruginea*, *Guibourtia ehie*, *Khaya ivorensis/grandifolia* etc.

After calculating the yield, the number of trees to be removed is selected from the stock maps according to prescribed rules and regulations outlined in the Logging Manual, Handbook of Harvesting, and Manual of Procedure for Stock Survey and Yield Allocation by the Planning Branch of the Forestry Department. The prescribed measures are intended to reduce excessive canopy openings and minimise any damage which may retard basal area recovery of the residual stand. As a rule of thumb, the residual stand should have a basal area not less than 5 - 15m²/ha. to ensure a successful rehabilitation within one felling cycle.

The application of uniform yield formula provides a framework for comparison and monitoring yield dynamics throughout the forest zone of Ghana. The ecological factors considered alongside its application (e.g. forest condition, rare and threatened species) and other related site factors during the selection (proximity to water bodies, slopes etc.) make the formula ameliorative in its functions.

LOG CODING SYSTEM IN THE WEST AFRICAN SUB-REGION

In connection with the timber harvesting rights, all logs are required to be duly marked at both ends

with approved valid marks before evacuation from the forest. These marks constitute the basis of a coding system which is subsequently used for identifying logs. The log coding system is governed by various legislative and contractual obligations in the West African sub-region as outlined in Part 1 of The Trees and Timber Decree 1974 NRCDC 273 in Ghana and in Part IV, of the Supplementary Act 1957 of Liberia and the adjoining Timber Concession Agreement (Schmithuesen 1986).

The prime purpose of the log coding systems is to control and monitor timber harvest. Additionally, it provides the necessary data inputs for registering logs as commercial products subject to existing tax and trade regulations. In spite of the differences among the log coding systems, the markings provide

the following information:

- Property Mark (Mark or Code of Stakeholder)
- Locality Mark, Zone, Forest or Reserve Code (Place of origin)
- Name of tree species (Trade name)
- Stock Survey Number (Inventory No. given to tree from which logs are derived.)
- Volume, Diameter and length measurements.
- Official Hammer Mark (Official Symbol stamped on log ends).

The log Coding System facilitates effective monitoring of Annual Allowable Cut; provides information for identifying logs for revenue collection, and finally help to verify the origin of timber resources, (e.g., whether logs were produced in a managed or unmanaged forest estate) - which is increasingly gaining importance on the international timber market in view of trends towards green labelling.

Contribution to local development

A further condition which has gained recognition in the sub-region is the involvement of stakeholders in the economic development of the area granted them by providing various social amenities such as schools, community centres, roads etc. for the privilege of utilising the inalienable resources of the people of the area. Currently, various legislative arrangements have been introduced to involve the local people in the process of granting concessions in Cameroon and Ghana.

For example, under subsection 6 (3e) of the Local government Law in Ghana, the District Assembly is enjoined by the law to manage the environment, which among others, includes the approving or disapproving of projects of ecological significance. Secondly, subsection 6(4d) requires that the District Assembly also encourages projects towards development of the area. It is therefore not uncommon that stakeholders are approached with all types of demands for local development.

In order to streamline these varied requests, Cameroon has replaced the social and public works which stakeholders had to undertake prior to 1983, with contribution of fixed percentage of taxes to an endowment fund for local development (Grut et al. 1991).

Certification of Tropical Timber

Apart from this internal control system, efforts are being made to introduce schemes of certifying tropical timber. The aim of the certification system is to verify whether the timber produce originates from a sustainably managed forest. In the first place, the developing countries are demanding that the certification policy should be extended to timber produce from all forests world-wide. There are also unsettled political questions about application of standards and trade related consequences which require to be addressed before the year 2000 (ITTO 1994).

ENFORCEMENT OF HARVESTING REGULATIONS

Within the framework of its functions, the granting authority is empowered to enforce regulations on harvesting controls either through its own outfit or appoint special agencies to do so.

Accordingly, the Forestry Administration throughout the sub-region, generally deploys both professional and technical staff to conduct felling-checks, post-harvest inspections, road lay-out inspections etc. to control whether stake-holders are keeping to contractual obligations.

For further control and monitoring downstream outside the forest, special governmental agencies have been set up to enhance and complement the enforcement network.

Ghana - Forest Products Inspection Bureau (FPIB)

The Forest Products Inspection Bureau (FPIB)

is an example of such an organisation in Ghana assigned with the responsibility of grading and standards controls of all timber and wood products destined for export. With its numerous check-points along the traffic net in the forest zone, FPIB staff is able to uncover during its routine control of logs in transit, several undetected harvesting offences contravening felling limits prescriptions, log marking regulations and property mark rights. FPIB has no direct powers to prosecute and therefore reports offenders to the Forestry Department for perusal. This mode of institutional arrangement contributes to long delays seldom resulting in a legal suit.

Cameroon - Societ  General de Surveillance (SGS)

In Cameroon, the government has appointed a private organisation to perform similar functions comparable to FPIB. Since July 1994, the Ministry of Finance has contracted the services of SGS to control and monitor log export, collect timber royalties and advice on royalty charges and reviews. Prior to shipment, SGS undertakes grading, labelling and comparison of records on logs with exporter's declaration to check under-invoicing and tax evasion (Baker et al. 1995).

Constraints To Harvesting Controls

In spite of the existing institutional arrangements a comprehensive enforcement of harvesting controls in the West Africa sub-region has been hampered by:

- obsolete laws,
- Inadequate logistics and incentives for field staff,
- corrupt and nepotic practices,
- Lack of institutional co-operation among enforcement agencies,
- Political pressures and civil unrest,
- Imposition of non-deterrent penalties by the judiciary for forest offences.

CONCLUSION

Stakeholders have played a vital role in the harvesting of timber resources since the beginning of timber trade in the West African sub-region. Initially, in absence of any formal control mechanism, wanton exploitation of timber resources continued until the beginning of the 20th Century when the colonial administrations began introducing basic harvesting controls for identifying stakeholders with property marks and subsequently felling limits prescriptions.

With the establishment of forestry administrations throughout the sub-region, various forms of harvesting controls systems have evolved over the years in response to changing socio-economic, political and economic circumstances of the timber resources. Accordingly, the scope of controls has been extended beyond general fundamental requirements, to embrace more pro-active forest conservation strategies currently demanded

by the international timber market following trends towards green labelling.

Harvesting controls in the sub-region serve as performance control for:

- Resource Allocation (Area and Duration);
- Pre-harvesting operations towards orderly assessment of resources and infrastructure development;
- Efficient harvesting of resources (Harvesting plan, sequence frequency and deployment of technical inputs);
- Restrictions regarding felling limits, yield allocations, ecological and technical considerations;
- Post-harvesting operations (felling checks and stand amelioration measures)
- Promotion of socio-economic development of the area (Trickle-Down Effects of benefits).

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