# Understanding illegal logging in Ghana: A socio-legal study on (non)compliance with logging regulations

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# 2 Estimation of illegal logging by the formal timber sector in Ghana: implications for forest law compliance, enforcement and EU-Ghana voluntary partnership agreement

This chapter has been published as:

Boakye, J. 2015. Estimation of illegal logging by the formal logging firms in Ghana: Implications for forest law compliance, enforcement and the Ghana-EU voluntary partnership agreement. *International Forestry Review 17(2): 1-11*

## 2.1 Introduction

The subject of illegal timber logging, particularly in the context of tropical high forest has been high on the international agenda for the last couple of decades. A lot of scholarly articles have been published on the subject (e.g., Brack, 2003; Kaimowitz, 2003; Tacconi *et al*., 2003; Tacconi, 2007). Similarly, environmental or green groups, the civil society as well as national governments and international organisations have all expressed deep concerns about the increasing rate of loss and degradation of the tropical high forest through illegal harvesting and illicit trade. These concerns are not misplaced, judging from the obvious financial, social, ecological and environmental consequences of tropical forest degradation and deforestation. Continued deforestation and forest degradation pose a major threat to the economies of countries where forests and related resources are significant contributors to socio-economic developments and to the livelihood of the many communities that depend on the forests, as is the case in many developing countries (Ochieng *et al*., 2013). Globally, deforestation is seen as one of the main causes of global warming. In Ghana, illegal logging has been identified as one of the major causes of forest loss and degradation (Appiah *et al*., 2007, Blay *et al*., 2007, Hansen and Treue, 2008; Marfo, 2010; Osei-Tutu, 2010).

But what exactly is illegal logging? One of the major problems involving discussions on illegal logging is the lack of a universally accepted definition on the subject (MCPFE, 2007). In the Ghanaian context, like elsewhere, illegal logging takes place when timber is sourced, allocated, harvested, transported, processed and traded in violation of national laws (GoG-EU, 2009). For the purpose of this paper, any timber harvested and/or transported outside the prescribed number, species and volume of trees by a competent forest authority is deemed illegal (FPA, 1974). The selection of the prescribed yield takes into account the annual allowable cut (i.e., the optimal volume of timber that could be removed annually by all logging firms in Ghana from all the forest reserves).

Illegal logging and associated trade in such products are a problem of both international and national proportions. Consequently, Ghana has rolled out several initiatives in the last half century aimed at dealing with the menace. At the international level, Ghana has ratified a number of conventions/agreements including, the Convention on International Trade in Endangered Species (CITES), the Convention on Biological Diversity (CBD) and the International Tropical Timber Agreement (ITTA). At the regional level, Ghana is a signatory to the African Forest Law Enforcement and Governance (AFLEG) initiative among others. On the domestic front, Ghana has over twenty pieces of principal and subsidiary legislations dealing with forest protection and management. In spite of these legal instruments, the problems of illegal logging and associated illicit trade in such products still continue, raising questions about the effectiveness of these instruments in promoting conservation and sustainable forest management.

In a quest for lasting solution to the problem, Ghana in 2008 signed the Voluntary Partnership Agreement (VPA) with the European Union (EU) to combat illegal logging and strengthen forest governance. The VPA is an instrument of the EU's Forest Law Enforcement Governance and Trade (FLEGT) action plan that aims at ensuring that all timber products from Ghana into the EU are obtained from legally recognized sources (Beeko and Arts, 2010). The objective of the EU-Ghana VPA, consistent with Ghana's own forest sector policy on sustainable forest management, is to contribute to forest law enforcement and governance of Ghana's forest sector. An important part of Ghana's VPA is the establishment of a licensing scheme to ensure that only timber products that have been produced in accordance with Ghana's national legislation (its definition of legal timber) are exported to the EU (GoG-EU, 2009). Under the licensing scheme, timber products from Ghana to the EU will require a valid FLEGT license which would constitute a proof of due diligence on the legality of the timber products concerned. Although the overall objective of the VPA is to ensure that all sources of commercial timber products processed and acquired in Ghana destined for both European Union (EU) and non-EU markets, as well as all timber sold on the domestic market are legal, FLEGT Licenses are, however, only issued for exports to the EU (GoG-EU, 2009).

Ghana will soon issue its first FLEGT license and, evaluation of its success or otherwise as an instrument of controlling illegal logging is to be done annually afterwards (GoG-EU, 2009). Unfortunately, there is remarkably weak empirical data on the extent of illegal logging in Ghana (particularly by the formal sector) upon which any future evaluation could be based. The purpose of this study therefore is to; estimate the level of illegal logging as a basis of determining a reference scenario against which the success or otherwise of the VPA could be measured in future; it will also address the implications of such finding for the general level of compliance with logging rules; and the effectiveness of the current enforcement measures by the Forestry Commission of Ghana.

## 2.2 Background

This subsection takes a look at the forest resource situation and the timber harvesting regulations in Ghana

### 2.2.1 Forest resource situation in Ghana

Ghana has two broad vegetation zones namely the tropical high forest (closed forest) zone occurring in the south-western part and the savannah (open forest) in the northern part of the country. In terms of commercial timber harvesting, it is the tropical high forest zone that is of major importance. This zone covers 8.2 million ha in the south-western third of Ghana including 1.8 million ha permanently gazetted as forest reserves and dedicated to forestry activities where no other land use is permitted (Fig. 2.1) (Adam *et al*., 2006; Hall and Swaine, 1976). The forest reserves are broadly divided into two; production forest reserves, where timber harvesting takes place and protection reserves, which are managed for purposes other than timber production. The remaining areas are collectively termed outside forest reserves (OFR) where other land uses are permitted. Legally, timber harvesting takes place in both the production forest reserves and outside forest reserves.

Floristically, the tropical high forests of Ghana have high species diversity of about 2500 including some 800 tree species that grow to timber size of 50 cm diameter at breast height (dbh) (Hawthorne and Abu-Juam, 1995). In Ghana, about 95 % of the forest lands are owned by the various traditional authorities with the remaining 5% held by the State (Birikorang and Rhein, 2005). However, it is the State that manages all the forests and naturally occurring timber trees in trust for the traditional authorities. Private logging firms exploit the timber under a licensing system and the resultant revenue is shared between the State and the land owners based on a formula in the 1992 Constitution of Ghana.

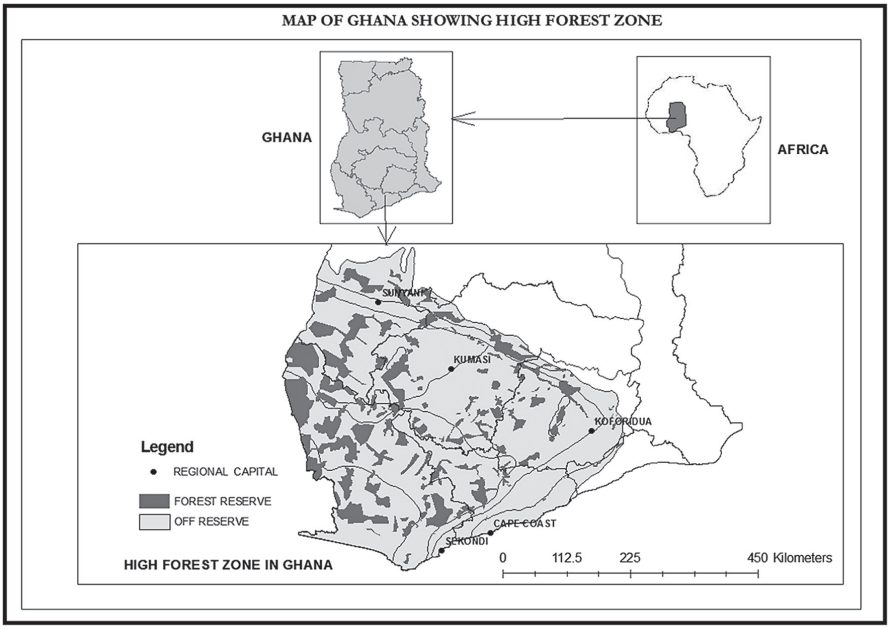


*Figure 2.1 Map of the tropical high forest zone of Ghana*

### 2.2.2 Timber harvesting regulations in Ghana

The starting point for harvesting legal timber in Ghana both in forest reserves and off-reserves timber lands is the acquisition of a valid timber harvesting rights. Prior to 1962, the Concessions Ordinance of 1936 (Cap 136) governed the allocation of timber harvesting rights in Ghana. Under this Ordinance, the traditional authorities granted timber concessions and the State, through its special Concessions' Courts, validated them. However, in 1962, the Concession Act, (Act 124) was passed to vest all rights to naturally occurring trees in the President in trust for the various land owing traditional authorities. Additionally, the powers to grant concessions were taken from the traditional authorities and vested in the President. A new system of allocating timber harvesting rights through a competitive bidding process was introduced in 1998 under the Timber Resources Management Act (TRMA) (Act 547) and it's enabling Legislative Instrument, the Timber Resources Management Regulation (TRMR) (LI 1649) to replace the concession system (TRMA, 1997; TRMR, 1998). Under these enactments, three main timber harvesting rights are identified, namely Timber Utilization Contracts (TUCs), Timber Utilization Permits (TUPs) and Salvage Permits (SPs).

A TUC is a written contract between the State and a private logging firm, with the consent of the land owner concerned, that allows the logging firm to harvest timber from a certain area in the contract for a certain time period specified in the contract (ibid). A TUP is granted to rural community

groups, District Assemblies, forest-owning communities and etc to harvest a specified number of trees in an area of land not subject to a TUC. Timber harvested from such areas are for important social or community purposes only and not for sale or exchange (TRMR, 1998). SPs are granted for removal of trees from areas of land undergoing approved development such as road construction, expansion of human settlement and cultivation of farms. All the three types of harvesting rights can be granted in both production forest reserves and off-reserve areas. The procedures for the grant are comprehensively set out in TRMA (Act 547) and TRMR (LI 1649). A further discussion of the content would fall outside the scope of this study.

In Ghana, the processes of logging in both reserves and off-reserves are quite different. Each is briefly discussed. In forest reserves, each TUC area has an approved operational or management plan with a harvesting schedule detailing the sequence of timber harvesting for the area under a 40-year felling cycle. Timber harvesting in reserves takes place within a compartment; a basic unit of forest reserve with an average size of 128 ha where all management prescriptions take place. The main requirements for logging in a compartment are the enumeration of all economic timber species with stem diameter of 50 cm dbh and above, preparation of pictorial maps showing the location of all trees and other topographic features and the selection of yield (Anon, 1995). For purposes of sustainable forest management (SFM), the optimal volume of timber that could be removed annually by all logging firms in Ghana from all the forest reserves should not exceed the national indicative felling limit (NIFL) which is fixed at 0.545 million $m^3$ (Affum-Baffoe, 2002). This figure was derived from the results of 2001-2002 multi-resource forest inventory in the high forest zone as the sustainable level of timber harvest that the forest reserves can tolerate (ibid).

The harvesting of approved trees is the responsibility of the logging firm and is monitored and controlled by two-stage documentation: Tree Information Form (TIF) and Log Information Form (LIF). Each tree felled is measured and recorded on TIF, prior to cross-cutting, by an officer of the FC within two days (TRMR 1998). The TIF provides the basis for the computation of the actual volume of each tree felled and the stumpage fees payable on it. Stumpage fee represents royalties to the landowner (in most cases a traditional authority) and charges for the cost of timber harvested. The aggregate of the TIF data for all logging firms in Ghana for a particular year gives the official quantity and volume of trees legally felled for that year. Each log produced from a tree is measured and recorded on LIF by the logging firm. The LIF provides the basis for issuance of a Log Measurement and Conveyance Certificate (LMCC) which controls the movement or transportation of logs from a forest area to a processing facility. The LMCC contains information on the exact volume of logs taken from the forest and serves as a proof of the legal origin of the logs or timber products in transit within Ghana (Anon 1995, TRMR 1998).

Timber harvesting in off-reserve areas is also subject to TUC, salvage permits as well as TIF, LIF and LMCC. However, it is not rigidly controlled as in forest reserves due mainly to the existence of other land use options including large scale farming, mining and urban settlements that are incompatible with sustainable forest management. There are no management plans for TUC or salvage permit areas in off-reserves but only operational or approved harvesting regimes. However, in 1994-1995, the Forestry Commission conducted a nationwide off-reserve timber inventory and allocated quotas to each forest district as part of the measures to introduce some level of control in the exploitation of timber resources there. The quotas at the time, represented the optimal (maximum) volume of timber that could be removed per year and the figure was put at 500,000 $m^3$ (Anon, 1995). Nonetheless, this figure was not adhered to by the Forestry Commission when it was realized that farming and other developmental activities in the off-reserve areas were destroying more trees than anticipated. The quota has since been increased to 1.5 million $m^3$ (Anon, 2005). Other measures introduced to regulate the off-reserve timber harvesting include pre-felling inspections of all economic species with tree stems of 50 cm dbh and above, preparation of stock and yield summaries indicating all trees enumerated during the pre-felling inspection and those actually selected for harvesting respectively. The Regional Forest Manager (RFM) who is a state official approves the number of trees to be harvested (yield) for the logging firm to commence for harvesting operations.

### 2.2.3 Nature and quantitative information on extent of illegal logging in Ghana

This section presents an overview of the actors, nature and various studies on the extent of illegal logging in Ghana. Different actors are involved in illegal timber harvesting in Ghana. The main actors are the registered logging firms and unregistered chainsaw operators who use powered chainsaw machines to harvest timber and convert them in-situ into lumber (Odoom, 2004). There are also canoe carvers who harvest mainly *Triplochiton scleroxylon* (Wawa) species and carved them into canoes for fishing. However, studies have suggested that the chainsaw operators and the registered logging firms are the main perpetrators of illegal timber harvesting in Ghana (Birikorang *et al.,* 2001; Hansen and Treue, 2008; Marfo, 2010).

In the Ghanaian context, like elsewhere, illegal logging among the registered logging firms takes diverse forms including harvesting timber in excess of the approved yield, harvesting in areas beyond the limits of approved TUC or salvage permit and harvesting with expired documentation. The illegal chainsaw operators, mostly operate at night and non-working hours in virtually every forest area they could find. Most of them are armed and ready to attack any person including forestry officials who dare to confront them or use informants stationed at vantage points to alert them of any approaching danger.

Perhaps the maiden work on quantitative estimation of the extent of illegal timber harvesting in Ghana was that of Birikorang *et al.* (2001). They used field survey data with 1999 as the snapshot to arrive at a total log harvest of 3.7 million $m^3$ including 1.0 million $m^3$ legal harvest. Of the remaining 2.7 million $m^3$ illegal harvest, 1.7 million $m^3$ was attributed to the informal sector (chainsaw operators). The remaining 1.0 million $m^3$ was attached to the formal sector (registered logging firms). The main difficulty with their work is that the methodology employed is not well explained except to mention that it was based on 1999 field survey of logging firms in Ghana.

Hansen and Treue (2008) relied on timber harvest and export statistics from 1996 to 2005 to estimate the level of illegal harvesting at between 2.3 and 2.7 million $m^3$ annually. According to that study, the informal sector that supplies lumber to the domestic market accounts for two-thirds whereas the export-oriented formal sector was responsible for the other one-third. Although their methodology is well explained, their work solely relied on the 1999 recovery rates (i.e., volume of a particular timber product as a percentage of the log volume needed to manufacture it) and the distribution of the end products to domestic and export markets used by Birikorang *et al.* (2001). With passage of time these figures have changed and therein lies the justification for a new study that takes into account the current recovery rates and consumption patterns.

Other studies have concentrated on illegal timber harvesting by the informal sector. For instance, Marfo (2010), based on the estimated number of chainsaw operators and their annual production figures assessed illegal harvesting for the informal sector to be 2.5 million $m^3$. According to that study, 84% of lumber consumed locally in Ghana is illegally produced. Lastly, Hansen et al (2012) adopted the around-the-clock market monitoring of wood-transporting vehicles at 19 selected timber market centres to estimate the annual illegal timber harvest by the informal sector (chainsaw operators) at 1.4 million $m^3$.

## 2.3 Methodology

The study investigates illegal logging and its associated trade in Ghana at the national level, covering all registered logging firms, spanning over a 12-year period starting 2000 to 2011. Such a long timeframe allows investigation of trends and provides analytical robustness by levelling out stock fluctuations at mills as well as possible delays in updating official harvesting and export records (Hansen and Treue, 2008). The national level study as against a case study on such a sensitive subject is to prevent the possible blacklisting of any particular logging firm on the international market. The informal sector (including chainsaw operators, charcoal producers and fuel wood gatherers) is excluded and so are plantation grown timber species such as *Tectona grandis*. This means that only natural timber from the tropi-

cal high forest zone produced by the formal sector (registered logging firms) is considered in the study.

### 2.3.1 Data sources

Data for the study was obtained principally from secondary sources. For official information on illegally harvested timber, the study uses official statistics on the volumes of illegally harvested timber by all registered logging firms that have been detected and reported by the officials of FSD (state regulator). These statistics are contained in Forest Services Division annual performance reports available at its headquarters in both manual and electronic formats. Data on the total volume of trees officially (legally) harvested annually by all logging firms was obtained in electronic format from the Tree Information Form (TIF) database stored at Resource Management Support Centre (RMSC), the technical unit of FC. From the Log Measurement and Conveyance Certificates (LMCC), the Timber Industry Development Division (TIDD) of the Forestry Commission compiles and stores annual electronic data on the legal volume of logs transported by all operating logging firms from the forest to the saw-mills for processing.

Again, TIDD has an electronic database on timber products exports from Ghana. These timber products are manufactured from the logs and includes boules, lumber, plywood, veneer, flooring and furniture parts. Data on recovery rates or conversion efficiency (i.e., volume of a particular timber product as a percentage of the log volume needed to manufacture it) and distribution of products to export and domestic markets were, with modifications from the studies of Gyimah and Adu (2009), Marfo (2010) and TIDD (2010) respectively, adopted from Birikorang *et al* (2001). Details are captured in table 1. For now, Ghana does not export or import logs, they are therefore not factored in the assessment. The reliability of these data sources, the merits and demerit are analysed in the first part of the discussion section in this study.

*Table 2.1 Average recovery rates and distribution of products to export and domestic markets*

| Wood product | Recovery rate | Distribution of products | |
|---|---|---|---|
| | | Domestic market (%) | Export market (%) |
| Lumber[1] | 35 | 16 | 84 |
| Rotary veneer[2] | 30 | 50 | 50 |
| Sliced veneer | 40 | 50 | 50 |
| Boules[3] | 80 | 0 | 100 |

1 Lumber product distribution figures for the domestic and export markets are reliable estimates and not based on inventory or survey as none exist at the moment.
2 Modified from TIDD (2010)
3 Modified from Gyimah and Adu (2009)

### 2.3.2 Measurement of the extent of illegal logging

In this study, two approaches are used in the measurement of the extent of illegal timber harvested. With the first approach, the extent of illegal logging (EIL) is assessed as the percentage of illegal logs in the total legal tree/log production. This is expressed mathematically as,

EIL = (Reported illegal harvest/recorded legal harvest) × 100 ------- (1)

In this measurement, only the formal data sources on volume of legal and illegal logging for each particular year is used.

The second measurement is based on a comparison of the "actual timber production/harvested" and the legal (official recorded) harvest. The "actual harvest" is estimated indirectly as the round wood equivalent (RWE) of the various timber products manufactured by all saw millers. Here the total volumes of the various timber products manufactured annually by all saw millers are used to estimate the "actual volume of timber harvested".

Mathematically, the extent of illegal logging using this indirect approach proposed by Tacconi (2007) and adopted by Hansen and Treue (2008) is estimated as;

EIL = Total Actual Harvest (TAH) – Total Legal Harvest (TLH) ------- (2)

Where TAH= the estimated actual harvest or the RWE of the various timber products manufactured. The main products considered are boules, lumber, veneer/plywood and tertiary products. In this study, it is assumed that rotary veneer and plywood production are integrated. Similarly, lumber and tertiary products (flooring, furniture parts, mouldings and etc.) are also assumed integrated. What this means is that logs in-take for tertiary products are embedded in that of lumber, whilst that of plywood is embedded in rotary veneer.

*TLH* = Total Legal timber harvested (TIF) or legal log production (LMCC)

## 2.4 Results of the study

### 2.4.1 Estimated illegal logging

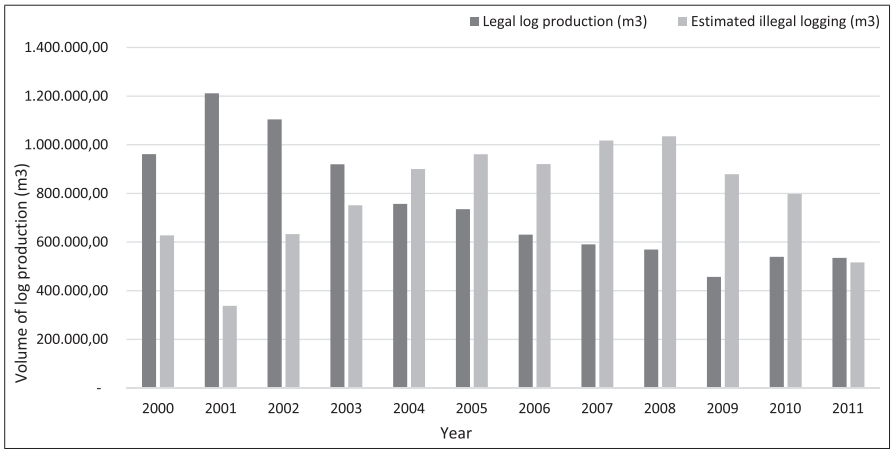


*Figure 2.2 Comparison of legal and estimated illegal log production (2000-2011)*

The results estimated a total annual average log production of 1.53 million $m^3$, including an annual average legal log production of 0.75 million $m^3$ (Fig.2.2). The remaining 0.78 million $m^3$ representing 104% of the legal log production is unaccounted for and could be deemed illegal logging.

### 2.4.2 Sources of timber harvested

The data indicates the dominance of the forest reserves as the major supplier of timber. Of the total 11.7 million $m^3$ of timber harvested within the period of the study, 7.2 million $m^3$ (62%) came from forest reserves. The remaining volume of 4.5 million $m^3$ (38%) was sourced from farm lands and fallow areas in the off-reserves.

Analysis of the data shows that whilst the national estimated annual average illegal log production stood at 0.78 million $m^3$ or 104% of legal log production, this figure was not the same for the annual average of all the 83 species harvested. Significant levels of variations existed among the individual species illegally harvested with some exceeding their legal limits by 740%. Figure 2.3 depicts the top eight species that were exploited in excess of 104%. The annual average illegal logging rate for the eight most affected species was 340%.

### 2.4.3 Illegal logging among species

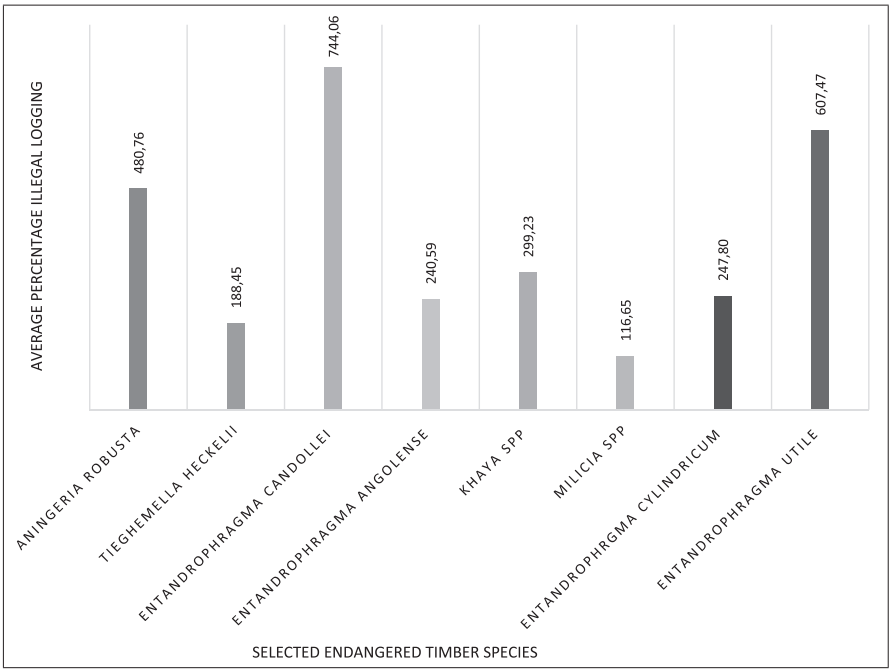


*Figure 2.3 Level of illegal logging among selected endangered timber species (2000-2011)*

## 2.5 Discussion

### 2.5.1 Methodological challenges

This part outlines the main challenges associated with the various data sources and each of the methodologies used in the study. The direct approach relied on the reported (official) volumes of illegal logging captured in FSD annual reports. The main challenges, as pertain to all criminal activities, included; non-detection of some illegal logging operations, non-reporting and under-reporting in terms of the frequency and actual volumes of illegal logging (MCPFE, 2007). The reasons for non-reporting and under-reporting could be the embarrassment that high reported illegal logging statistics cause to the enforcement officers. The second is the potential adverse impact it could have on the trade of timber from such countries on the international market (ibid). In Ghana for instance, Boakye (2003) observed that, sanctions (both real and perceived) from superior officers, poor end-of-year performance appraisal ratings and in some cases the involvement of forestry officials in illegal operations were among the reasons why some detected forest offences go unreported.

The indirect measurement also contends with the same challenges enumerated above in addition to the following; first, underestimation and overestimation of tree and log volumes. These may be intentional depending on whether the Forestry Official wants to help or punish a particular logging firm. It can also be unintentional emanating from errors in tree/log measurement to volume computations. Second, non-transmission of TIF and LMCC data from the various forest district offices to the collation centres at RMSC and TIDD offices respectively for varied reasons including sheer negligence. Third, non-capturing of TIF and LMCC data into the central database due to oversight and sheer negligence. Fourth, movement of logs without LMCC-the major reason being the delays in transporting logs to LMCC issuing points and sometimes shortages of LMCC booklets and absence of issuing officers from duty. Fifth, variations in recovery rates for same export product depending on such factors as contract/product specification, log quality, wood defects, type of machinery and expertise of machine operators. Sixth, lack of credible data on local wood consumption. Seventh, sale of confiscated logs and chainsaw lumber to registered logging firms that eventually find their ways into the export trade and finally under-reporting of export figures for tax evasion purposes.

Notwithstanding, the challenges enumerated for each of the approaches, the indirect approach should be preferred in the determination of the extent of illegal logging in the formal sector in Ghana. The reasons for this conclusion are discussed below.

### 2.5.2 Illegal logging trends in Ghana

#### *2.5.2.1 Quantitative analysis of volumes illegally harvested*

From the data analysis, the annual average estimated log production by the logging firms (formal sector) was 1.53 million $m^3$ including a legal harvest of approximately 0.75 million $m^3$. The remaining 0.78 million $m^3$ could not be accounted for and may be deemed illegal harvest. This means that 104% of the log production was of doubtful origin. The results suggest an increase in the level of illegal logging from 0.34 million $m^3$ (28%) in 2001 to over 1.00 million $m^3$ (182%) in 2008 (Fig. 2). Ironically, whilst the annual legal log production dropped in absolute terms from 1.25 million $m^3$ in 2001 to 0.54 million $m^3$ in 2010, the level of illegal logging moved from 0.34 million $m^3$ to about 0.80 million $m^3$ over the same period.

Again, whereas the average illegal logging for the study period is 104%, a detailed examination of the figures showed that the average for the period 2004 to 2011 alone was about 150%. This suggests that illegal logging by the formal sector is on the ascendency. Generally, this result supports earlier studies by (Birikorang *et al*., 2001; Hansen and Treue, 2008). Birikorang *et al*. (2001), for instance estimated illegal logging in 1999 at 1.00 million $m^3$ (100% of legal harvest). Similarly, Hansen and Treue (2008) estimated the

annual average illegal logging from 1996 to 2005 for the formal sector at between 0.8 and 0.9 million $m^3$ (or 70% of legal harvest).

#### *2.5.2.2 Variations in species illegally harvested*

The results revealed vast variations in levels of illegal logging among the various timber species harvested. Whereas the national average illegal logging for all species was 104%, some eight (8) species recorded an average of 343% above their legal limits (Fig.3). The ecologically threatened but economically valuable timber species including the *Entandrophragma and Khaya species* were the most affected. They were followed by *Aningeria robusta (Asanfena), Milicia excelsa (Odum) and Tieghemella heckelii (Bako)*. For instance, *Entandrophragma candollei* recorded an average illegal harvest of 744%, followed by *Entandrophragma utile* (607%), then *Aningeria robusta* (480%) and *Milicia excelsa* (117%). This observation confirms previous studies by Adam *et al.* (2006), Alder (1989), Ghartey (1989), and Hansen and Treue (2008) that illegal harvest was most predominant on the so-called prime species. The reasons for this observation are not far-fetched. These traditional endangered species are used for variety of purposes including constructional work, furniture, veneer and interior decoration and are therefore in high demand, easy to market and attract good prices in both the domestic and export markets.

The resultant effect of such practice is the creaming of the production forests which, according to Longman and Jenik (1987), is the preferential extraction of few timber species in the midst of several hundreds of potential timber species, or the removal of only the individuals within a species that are well-formed and the fastest growing. The eventual results are the loss of the forest value and degradation. To check this unhealthy practice, FSD should make available to TIDD all approved yield to serve as a check on the volumes of each timber species that can be legally traded. It is here that the proposed electronic wood tracking system under the VPA will be most helpful if properly implemented. It is also important for the government to institute measures that will promote the utilization of more timber species than the current number.

#### *2.5.2.3 Sources of timber supply*

The timber industry in Ghana depends principally on the natural forests in both reserved and off-reserve areas for supply of timber. From a historical perspective, log production from these sources has varied over the years depending on regulatory framework in place for forest management. The first formal forest policy adopted in 1948 provided for the maximum protection of the forest reserves areas and gradual decimation of the off-reserve timber resource to pave way for farming (cocoa and food crop production). Consequently, for the 1950s and 1960s most of the timber supply came from the off-reserves. Anon (1970) reported that for the period 1960-1970, the

average off-reserve timber production was 67% whilst the forest reserves' production stood at 33%. The proportions changed in the 1970s and 1980s following a forest management decision to remove all commercial trees in forest reserves with dbh 110 cm and above (the so-called over-mature trees) on a 15-year salvage period (Anin-Bonsu, 1970). From 1971 to 1980, the average log production from reserves forests rose to 61% whereas the off-reserves share was down at 39% (Anon 1980). This trend continued for the period 1981-1990, with the average log production from the reserves moving up to 64% whilst the portion of the off-reserves further dipped to 36% (Anon 1990).

With the completion of the removal of the over-mature trees and introduction of new stringent harvesting control measures for forest reserves in 1991, the proportions of timber production from the two main sources changed again between 1990 and 1999 with the off-reserves having 71% as against 29% for forest reserves (Birikorang *et al*. 2001). According to Adam et al (2006), the high demand for round log export for *Ceiba pentandra*, *Antiaris chlorophora* and other lesser known species which occur in large quantities in the off-reserve areas where harvesting rules and controls are less stringent increased logging activities in this area especially up to 1995 before the log export ban.

From the analysis of tree and log production data for the period 2000-2011, the proportions of forest reserves and off-reserve shifted again to 62% and 38% respectively. In absolute terms, the off-reserve log production declined from 0.64 million $m^3$ in 2002 to 0.29 million $m^3$ in 2011. This observation is in sharp contrast with what pertained in the 1990s, a clear indication that the off-reserve lands have been creamed of its timber resources due to inadequate control and lack of effective measures to restore what is harvested. The situation in the forest reserves is no better. It appears on the surface that the on-reserve production figures are increasing but the results of this study show they have decreased from over 0.72 million $m^3$ to 0.47 million $m^3$ over the same period. For the period 2006-2011, the on-reserve log production actually dropped by ten percentage points from 71% to 61%. What this means in practice is that the proportion of the on-reserve production is increasing at a decreasing rate.

Official reports on illegal logging from FSD annual reports (2000-2011) and TIDD export statistics on timber products did not segregate illegal harvest by origin. It is therefore difficult to indicate the exact quantities of illegal logs derived from each source. However, based on the National Indicative Felling Level (NIFL) of 0.545 million $m^3$ for all timber species and the near depletion of timber resources in the off-reserve, it is inferred that most of the illegal logging takes place in forest reserves. This situation has negatively affected the timber producing potential of the tropical high forest of Ghana (both reserved and off-reserve areas) and calls for serious interventions to reverse the trend. First, there is the urgent need to step up plantation forestry in both reserved and off-reserve areas to increase timber stock; and second, the adoption of effective enforcement measures

to safeguard the remnant natural forest from illegal and unsustainable exploitation.

### 2.5.3 Implications for forest laws compliance and enforcement

The results suggest that a high level of illegal logging exists even among the formal industry actors in Ghana. This situation indicates a low level of law-abidingness (compliance) of logging rules among the operating logging firms in Ghana. Apart from the logging firms in the formal sector, similar studies on the chainsaw operators in the informal sector portrayed low levels of compliance (Hansen and Treue, 2008; Marfo, 2010). It is possible to find wood vendors in the informal sector trading in illegal chainsaw lumber in the open market contrary to Regulation 32 of the Timber Resources Management Regulation, 1998 (LI 1649). This portrays an impression that illegal timber harvesting is a crime only within the forest gates/corridors and that once the logs or chainsaw lumber arrived at a market centre, they become "legal" to freely buy or sell.

Illegal logging among the logging industry poses a serious challenge to Ghana in achieving the shared global objectives on forests, a framework towards sustainable forest management. It is therefore incumbent on the State to use its coercive (policing, prosecuting and sanctioning) powers and promote acts that enable and encourage positive behaviour to elicit compliance among the logging firms. Again, a thoroughly socio-legal research on why and how logging firms violate the regulations that prohibit felling outside approved yield could also be useful in finding a cure to the problem.

The level of illegal logging observed in the study equally has serious implications for our assessment of forest law enforcement in Ghana. If the level of illegal logging revealed is a 'kind of barometer' to gauge the effectiveness of strategies being implemented by the law enforcement institutions to control illegal logging, then it may be reasonable to conclude that the existing enforcement strategies have not worked to satisfaction. This should be a wake-up call for the FC which is the main public sector institution charged with the responsibility for the protection, management, development and regulation of utilization of forest resources in Ghana, to critically monitor its own performance.

This may mean a lot of things to FC including reducing the opportunity and benefits for illegal logging. This should be done through; increase rate of detection of illegal logging by employing modern technologies (such as cameras and drones) in patrols and reconnaissance surveys, increase the benefits from the forest to the forest fringed communities and forest land owners to elicit their support in protection. It would also mean impressing upon the legislature to pass deterrent laws and the judiciary to impose heavy fines and sentences. Lastly, it could also mean, improving the general working conditions and logistical support to the front-line FC staff, naming and shaming culprits of illegal logging and end of chain consumer product brands using legally harvested timber and educating the citizenry in both

producer and consumer countries to purchase only legal wood products. Some of the measures put forward here may not be entirely new to FC but lack of resources and possible inertia on the part of the government may have prevented their full implementation.

### 2.5.4 Implications for Ghana-EU VPA and sustainable forest management (SFM)

Ghana will soon issue its first FLEGT license under the VPA with EU to signify its commitment to timber legality and sustainable forest management. However, the high illegal logging, the continued existence of the conditions-precedent for illegal logging in Ghana including; high demand for timber products, high levels of poverty, unemployment and corrupt practices (Appiah *et al*., 2007; Blay *et al*., 2007; Marfo, 2010), and emergence of other markets outside the EU with no regard for timber legality, all pose grave threats to the success of the VPA. Presently, there is a huge deficit between demand and supply of wood products (especially lumber) in the domestic market. This deficit is currently being met with illegal lumber from chainsaw operators who are supplying about 84% of the domestic lumber requirement (Marfo, 2010). It is important to understand that the illegal logging and milling businesses in Ghana have thrived over the years because the products supplied by them continue to be in great demand both locally and internationally. This supports a general principle enunciated by Passas (2002) that, illegal or criminal activities persist as long as the goods and services provided or produced by them are in great demand by the populace.

Another major challenge to the VPA is the existence and emergence of other markets outside the EU where timber legality is not a topmost priority. These markets in the West-African and Asia/Far East have already crippled the EU's share of timber products from Ghana. For instance, wood exports to the EU dipped from 257,000 $m^3$ (57% of total exports) in 2000 to 64,000 $m^3$ (20% of total exports) in 2011 whilst the share of the West-African sub-region within the same period increased from 35,000 $m^3$ (11.6% of total exports) to 163,000 $m^3$ (51% of total exports) (TIDD 2000, 2011). The share of Asia/Far East market also rose from 52,000 $m^3$ (12.3%) in 2000 to 82,000 $m^3$ in 2010 (20% of total exports) (TIDD, 2010). It can therefore be posited that the closure of the EU market (and by extension the markets of all the developed economies) alone to illegal timber products from Ghana when other markets within the African and Asian regions are wide opened will not immediately curtail illegal logging in Ghana. Again, the other conditions for illegal logging and associated trade such as poverty, unemployment and corruption still persist. The author can therefore hypothesize that the mere roll out of the VPA with the issuance of FLEGT license will not automatically freeze illegal logging or trade in illegal wood products from Ghana.

Should we then, on the basis of this evidence, conclude that the VPA is dead on arrival and of no relevance to Ghana in terms of meeting its stated objectives? Not at all! It only means that the parties will have to practically demonstrate absolute good faith in meeting their obligations under the VPA. They will have to work hard to address all the challenges identified that can militate against the implementation of the VPA. On its part, the Government of Ghana (GoG) will have to adopt a number of policy interventions including; supplying the domestic market with sufficient legal timber products. This could be done through directing certain timber species (including *Piptadeniastrum africanum*, *Pterygota macrocarpa*, *Terminalia superba* and *Morus mesozygia*) solely to the booming domestic construction industry, instituting a quota system for the export and domestic markets, developing and promoting other wood substitutes such as bamboo, rattans and plastics. Again, the GoG must use all its powers (both coercive and persuasive) to enforce all its logging regulations, work seriously at improving the economy in terms of job creation, poverty reduction and removing all the other underlying causes of illegal logging. The EU consumers on their part should be prepared to pay high premiums on timber products that meet the legality standards. This can help change the direction of timber trade in favour of EU countries. Again, the EU and other developed economies should use their persuasive powers to influence all other States to make timber legality a topmost priority. For allowing trade in illegal timber products in any market will be a serious threat to trade in legal timber globally.

## 2.6 Conclusion

This study has confirmed Hansen and Treue (2008) in that the indirect approach of using export statistics and log production figures gives better estimates of illegal logging than official records which were found to grossly understate the problem. It equally highlighted the widespread illegal logging in Ghana especially in the production forest reserves and among the prime timber species. The study uncovered the low level of forest law compliance among the operating logging firms in Ghana and the failure of the existing enforcement measures to halt illegal logging. Hence, the national roll out of the VPA in Ghana will be neither easy nor smooth and that the Parties to the agreement must demonstrate greater commitment beyond signature and rhetoric to cause the VPA to succeed.