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1. BACKGROUND

Ghana has signed a Voluntary Partnership Agreement (VPA) with the European Union (UE) which proposes measures to increase the capacity of developing and emerging market countries to control illegal logging, while reducing trade in illegal timber products. The Ghana VPA includes compliance and licensing for all timber and wood product exports through the Forest Law Enforcement, Governance and Trade (FLEGT) Licensing system. The system to be established checks compliance with all aspects of forest-related legislation and monitors legal compliance through the production chain from the forest through the mill and to the port of exportation.

For the issuing of FLEGT licence a wood tracking system is required which will be able to trace the wood from the forest where it is harvested until the point of export.

The “Wood tracking system implementation project in Ghana” sponsored by ITTO, consists of an investigation into the current wood tracking system in Ghana, with the objective of detecting and analyzing possible weaknesses and critical points, with the purpose of developing a new wood tracking system that allows companies to verify the traceability of their material from the forest until sawmill, warehouse and port.

The aim of this project is to increase the capacity of small and medium companies to produce and commercialize wood products from legal sources. It should be recognised that this project is being carried out in parallel to the Ghana Forestry Commission’s own wood tracking project which is based on the use of a bar coded marking system and handheld GPS referenced computers.

It is necessary to point out that the efficacy of a system for ensuring legal compliance can never be fully assured. In situations where control and supervision of those responsible for management of the system is weak or where the levels of corruption are high then any control system can be overcome. Ghana already has a rather large number of officials involved in legal compliance in comparison with for example the UK. The UK which produces 8.8 million m3 of Softwood and 0.5 million m3 of hardwood has only 20 full time equivalent forest law enforcement posts, 1 per 0.5 million m3 of roundwood. Ghana already has far more than this and is still afflicted with a very high level of illegal activities in the forest sector.
2. METHODOLOGY

The project was carried out in three main phases:

1. Preparation phase was carried out prior to the field work in Ghana. The following points were researched and analyzed:

   - Analysis of the Ghana Wood Tracking System.
   - Wood tracking systems implemented in small and medium enterprises in other countries.
   - Details of FSC Chain of Custody control systems implemented in small and medium enterprises
   - Available wood tracking technologies in use elsewhere or proposed for use.

2. Field Work. This was carried out from August 4th through August 14th in Kumasi (Ghana). The following tasks were done:

   - Investigation of the current WTS in both on and off reserve situations
   - Research about log transport from the forest to the sawmill.
   - Physical tracking of the wood from the forest until it reaches the sawmill. This included checking the activities at all of the different checkpoints along the road, and verifying the information that was recorded and checked at each of these control points.
   - Research about the procedures used in small and medium sawmills. This included an examination of all of the documents required for legal harvesting and transport of timber from the forest to the mill gate.

3. Develop a Wood tracking system

A new wood tracking system was developed with the objective of allowing small and medium enterprises to keep the track of the wood, in order to demonstrate that their products come from a legal source.
3. CURRENT WOOD TRACKING SYSTEM IN GHANA

Below the current wood tracking system in Ghana is described. The research was carried out in on and off reserve situations where active harvesting was taking place. Copies of all documents relating to the harvest were made available to us. The field work was carried out over a period of six days and involved inspections of harvested sites, forwarding operations, log bucking operations, loading and transport to the mill and finally reception procedures at the mill. Log dimensions were physically measured and compared to those stated in the transport documentation. We did not verify the payment of necessary royalties, taxes and other duties with the regulatory authorities.

3.1 Pre-harvest Planning

3.1.1 Reserve situation

The first step to obtain the endorsement of the forest harvest in a reserve situation is the issue of the Timber Utilisation Contract (TUC). The objective of the TUC is to tighten the planning controls on timber utilisation and at the same time to ensure that the interests of the communities and land owners are fully taken into account through the specification of the Social Responsibility Agreements.

The Forest Service (FS) is the responsible for issuing the TUC, the first step is to identify the harvesting areas by carrying out the following activities:

- updating of compartment maps
- initial scheduling of compartments for harvesting
- field checks
- fixing of boundaries where there are protection zones for the purpose of fine and coarse grained environmental conservation.
- Main accesses and road revision

In other words the TUC gives the overview of the contract as a whole.

Different companies give proposals to harvest the forest, which are evaluated and selected by the Timber Rights Evaluation Committee.

In the management of the TUC areas, the first step corresponds to the development of the TUC operation plan by the contractor. This plan provides the major details of the operations are given which will be carried out in the coming years.
Later comes the pre-survey compartment inspection, this is an inspection of each compartment to be harvested by the district level staff of the forestry commission and the contractor before the stock survey. The purpose is to check in detail topography, storage and access characteristics.

The next step is the Stock Survey. The stock survey registers the species, diameter and establishes the location of all trees (over 50 cm diameter) and at the same time the tree is designated with the corresponding stock number. Additionally the protected species, the slopes, forest conditions, hydrological resources and roads are identified and mapped. This work is responsibility of the FSD. In some cases this activity can be performed by the contractor, whenever the FSD has verified that their staff is able to do this task.

With the information obtained in the stock Survey, the stock map is prepared which details the position of the registered trees in the forest, showing their species and diameters. This work maybe performed by an experienced contractor, being checked by district officers for their approval.

In the Yield Estimation the trees for each compartment are selected, these trees are authorized to be harvested by the contractor in a particular period of time.

This selection is based on the following criteria:

- Ensure a good distribution of trees after logging.
- Need to favour removal of damaged, but still utilisable trees.
- No more than 3 trees/ha can be removed
- Trees to be removed must conform to the minimum felling diameter regulations for the species.

Besides, the following rules of forest protection are considered:

- No harvesting within 25 m of small watercourses and 50m of rivers.
- No logging on slopes above 30%
- Open areas in the forest should be prevented.

Yield approval can only be done by a district forest officer. From the above information the Yield List for each compartment is generated, where the stock number, species and diameter of the harvest authorized trees are indicated. In the same time the yield map is produced showing the location in the forest of the trees to be harvested.

The contractor receives copies of the yield list and yield map indicating the stock numbers, species and estimated diameters of the selected trees. With this information the contractor may start the harvest activities in the compartment.
Weaknesses:

In the Pre-harvest planning stage, certain aspects were found that can weaken the subsequent wood tracking system.

One of the main weaknesses is the stock and yield map prepared by the FSD or by the contractor. These maps are not a correct representation of the elements found in the field. During checks made in the forest it was found that many trees have different locations to the ones in the map or the maps are not accurate. In addition to this, it was clear that the company staff that use the map information, for example to identify the tree to be harvested do not have enough knowledge to understand and read the map information.

Another weakness found was that the marks of the stock number scribed by FSD onto the stumps are not sufficiently durable since in some stumps observed, the stock number was almost illegible and in other cases missing completely.

Another important factor to consider is that many stolen trees were detected in the field. These were stolen before the contractor arrived in the compartment. In most cases there was evidence of trees having been stolen and sawn into boards in-situ before being carried out of the forest. In some cases trees were felled but the log never was removed from the forest.

3.1.2 Off-Reserve situation

In the off-reserve situation the identification preparation and management procedure of TUC are performed in a very similar way to the on-reserve situation ones. The difference is that quotas are calculated in the districts for the different off-reserve situations in order to limit the annual quantity of wood extracted in a particular area.

Additionally, in the off-reserve situation the Social Responsibility Agreement has an enormous importance since it is not possible to do the harvest without consulting the corresponding community.

The stock survey consists in that the same contractor selects the trees he/she wishes to fell. Later, the pre-inspection of trees to be harvested come, where the district officer marks with a correlative number the authorized trees to be harvested. In addition, the approval by the land owner and farmers is required; compensation payments are fixed for the possible damage to crops that the forest harvest may cause.

The approval permission for the harvesting of said trees is issued by the district officer and the contractor prepares the annual harvest plan.
Weaknesses:

The weakness found in the off-reserve situation is when the contractor carries out the assessment of compensation due to the farmers for the damages suffered by their crops from the harvesting activities, it does not consider the damage to the soil caused by the machines and the possible erosion in those areas.

3.2 Harvest

3.2.1 Reserve situation

The contractor in the forest identifies the trees indicated in the yield list and proceeds to fell them. Immediately after felling the stump is marked with the following information which is encoded in an abbreviated form:

- Locality mark
- Contractor name
- Stock Survey number
- Species Code
- Compartment number
- Reserve name

Thereupon after harvesting the tree and before removal from the felling site, a Technical Officer of the FSD measures the log diameters and its length. Subsequently, he/she completes the Tree Information Form (TIF). The following information is registered for each tree:

- Stock Survey number
- Tree number
- Species
- Length
- Butt end diameter and the small end diameter
- Volume is estimated

An example of a TIF is provided in Annex 1.

Furthermore in each form the contractor and information about the place where the wood was harvested is detailed. The TIF is signed by the Technical Officer of the FSD and the contractor staff. With the information in the TIF, the FSD calculates the corresponding royalty the contractor must pay.
Where the tree can be forwarded without further crosscutting it is forwarded to the landing for crosscutting. Some larger trees need to be crosscut in the field before forwarding. The tree or log is now forwarded to the log landing where it is crosscut. The logs are recorded and their new dimensions are entered into the Log Information Form (LIF). This process is carried out by the contractor. In this form the following information is registered.

- Contractor
- Location Compartment
- Stock Survey number
- Tree number
- Species
- Log´s Length
- Log´s Butt end diameter and the small end diameter
- Log´s Volume

Annex 2 provides an example of a LIF

At the log landing each log that will be removed from the forest is marked with the following information:

- Locality mark
- Contractor’s Name
- Log Number
- Stock Survey number
- Compartment number
- Species
- Reserve name

Each LIF is delivered to the Forest Services Division (FSD) office and their staff cross-check the LIF registers with the TIF information. They check for the existence of repeated tree numbers and the coherence between the volume of all the logs and the volume of their respective tree of origin.

If there is no problem, the LIF is approved by the Technical Officer of the FSD.

**Weaknesses:**

A variety of problems were detected in the harvesting process which resulted in an immediate failure of the log tracking system. It can safely be said that already at this stage it is practically impossible to be sure of linking logs exported from the forest to the stumps remaining in the forest. These failures in the system included evidence for the harvesting
of trees prior to the opening of the compartment, the harvesting of trees not in the yield and the failure to properly register information about trees legally harvested.

In the first place, it was detected that the log marking process was carried out in the landing and not in the forest after the crosscut as it should be. It means that the logs are cut and subsequently removed from their origin in the forest to the landing where they are stored unmarked and mixed with other logs from different origins; this is when the logs are marked. With this current situation the frequency of making mistakes increases and the possibility to change or invent new numbers does not assure the wood traceability. The log marking process should take place immediately after the crosscut, in order to identify each log before it is removed to the landing and mixed with other logs from different trees. Only in this way can the loss of traceability be avoided.

Furthermore, some trees which were planned to be harvested in the yield list of the compartment were not present in the forest. The reason is those trees were harvested before time, when adjacent the compartment was harvested. These logs must be considered illegal since the compartment had not been opened for harvest when they were taken.

In the field work, in some cases, the swapping of stock numbers in trees was observed. For example, the contractor felled a tree that is not indicated in the yield list and allocates the number of the other tree registered in the yield list. In other word the company staff records a false stock ID number taken from another tree within the yield allocated by FSD. This situation happens mainly with large diameter trees with easy access which are located close to roads and landings.

Some recently harvested trees were detected that do not have the stock number marked on the stump. Probably they have been stolen by illegal loggers between the stock survey date and compartment opening which can be over a year. In some cases there is clear evidence that these trees were sawn into boards in situ and the boards than removed by hand. In other cases the tree is left in the forest untouched.

Another critical point found is the process of filling in the TIF by the Technical Officer of the FSD, it is not an independent work done by them because they always do this process accompanied by someone from the company. In many cases the FSD officer is not actually present at the time the TIF is filled in since in most cases they visit the harvesting site sporadically and the harvesting team does not wait for their presence before hauling logs to the landing and carrying out the cross-cutting. Besides, the officer measures the dimensions of recently felled trees and does not check if the tree number coincides with the stock number so as to detect and inform possible problems.

The LIF are issued by the contractor and handed in when the truck leaves the forest. In order to demonstrate a reliable process this form should be sent immediately after the
crosscut process. This change would reduce the time to issue the LMCC and the transport cost.

The last weakness found was that in case of detecting a problem like the cases above mentioned, the contractor does not inform to the FSD, in order to find a solution and determine responsibility and assign compensation.

In effect the contractors control the entire process and carry out most of the work that should be carried out by the forestry commission. The supervision of this process by the FSD is extremely lax and as a result there is no effective control of the chain of custody. The present system allows illegally harvested timber to enter the supply chain freely.

3.2.2 Off-Reserve situation

This process in an off-reserve situation is very similar to a forest in a reserve. The contractor felled all the authorized trees. The Logs and stump are marked with the following registers:

- Property Mark
- Type of forest
- Region Code
- Species
- Stock number/log number
- Off-reserve

**Weaknesses:**

Several logs were found stored in a landing without the corresponding stock numbers. In other words these logs were hauled from the forest to the landing without their stock numbers or information written on them making it impossible to trace them to their origin. The stumps of those trees in the forest have not been marked with the corresponding information.

Once again there is an immediate loss of the chain of custody at the point of origin in the forest, it is therefore impossible to verify if the logs to be transported are of legal origin.

3.3 Transport

3.3.1 Reserve situation

a) Transport documentation
The truck is loaded with the logs at the landing. Before the loaded truck leaves the forest the contractor issues the waybill. This is an internal company transport document issued for each truck describing their load.

The waybill contains the following information:

- Contractor name
- Waybill number
- Origin and destination
- Vehicle number and driver’s name
- Species
- Stock Survey Number
- Log Number
- Date

Annex 3 shows an example of a waybill.

With this document the truck leaves the forest and travels to the nearest FSD office. At this point, the FSD officer using the LIF registers completes the Log Measurement and Conveyance Certificate (LMCC) which is handed to the driver and is kept until the sawmill.

The following information is registered in the LMCC:

- Contractor
- Property Mark
- Forest District
- Driver’s name
- Vehicle Number
- Destination
- TIF number
- Reserve code
- Compartment
- Stock survey number
- Tree number
- Log number
- Species
- Diameters
- Length
- Volume
Each LMCC have five copies, one is kept in the FSD Office. Two are handed in to the TIDD checkpoint, and two remain in the company. The original copy has the official FSD stamp. (see Annex 4)

b) Checkpoints

Along the path from the forest to the destination (sawmill, plymill, etc), there are different checkpoints where some transport documents are checked. The checkpoints are the following:

- **Police Checkpoints:** There are several police checkpoints in the roads that connect the forest (On and Off Reserve) to the facilities. The following document is checked:

  - LMCC. The police check the authenticity of this document, to go through the FSD stamp, date, origin. In addition police check the truck information, such as the driver’s name and the vehicle number.

- **FSD Checkpoint:** In the road there is a checkpoint belonging to this division, and they check the following document:

  - LMCC. FSD Staff check the authenticity of this document through the FSD stamp, issue date, origin and duplicated copies. In addition the staff check the vehicle number and driver’s name.

The staff carry out a visual inspection of the loaded truck, checking the species and stock numbers.

- **TIDD (Timber Industry Development Division) Checkpoint:** All trucks must be checked in at the TIDD checkpoint. These are located in areas near to the facilities, for example around the cities. The staff check the following documents:

  - LMCC. TIDD staff check the authenticity of this document through the FSD Stamp, and check the logs number and their species loaded in the truck.

  - Way Bill. Check the information of diameters and species registered in the waybill with the registers of the LMCC, in order to confirm the information coherence.

**Weaknesses:**

The principal weaknesses in the system arise from the fact that it is not applied in the way it was designed. Officially the LMCC forms should be completed by an FSD officer in the
forest before the loaded trucks are dispatched. This is not possible because the FSD officer is usually not present in the forest when the trucks leave. As a result the LMCC is issued by an FSD officer with an office at a transport node located some distance from the forest and able to service several TUCs.

In addition there is no point along the transport route where the logs are properly measured by an officer of the Forestry Commission. The measurements provided by the company are never checked and as we will see are usually an understatement of log volumes.

Finally the FC officers responsible often do not carry out even the reduced task that they are supposed to and simply sign the relevant documents without even the most cursory inspection of the loads.

Several weaknesses in the transport documents issue were found. The waybills issued by the contractor do not register the logs dimension (diameters and length), and only registered the stock numbers and species.

The LMCC issued by the FSD presents some failures such as:

The LMCC information is only a repetition of the LIF registers, which is issued by the contractor.
The official does not carry out any log measurement of the load on the truck.
Subsequent to the LMCC issue, the official carries out only a visual inspection of the logs in the truck. The official does not always perform this activity.
The LMCC issue process is extremely slow. In the field work a waiting time of more than 24 hours was observed to issue an LMCC, resulting in a significant increase in transport cost due to capital costs of truck and labour cost of idle drives.

The FSD staff does not store the document in secure conditions and it is not recorded in a proper filing and document control system. This constitutes a significant breach of chain of custody procedures.

Furthermore, a weakness in the checking by the checkpoint staff along the road was observed. All of them mainly check the LMCC authenticity, but they do not measure the logs transported by the truck. In the FSD checkpoint there is only at best a simple visual and inspection of the load, while in the TIDD checkpoint the stock number and species were checked but they do not measure the logs diameter and length to corroborate the LMCC information.
3.3.2 Off-Reserve situation

The wood transported from an off-reserve to the sawmill is carried out in the same way as that from a forest reserve. It therefore presents all of the same weaknesses in the COC system.

3.4 Log Reception at the Sawmill

3.4.1 Reception situation

The truck carrying logs enters the sawmill through the main gate. The first control is the sawmill gate where the input and output truck information is registered.

The documents registered at the security gate are the following:

- **Gate Pass.** Contractor’s internal document issued when the truck leaves the factory. In this document the destination, date, vehicle number and driver´s name are registered.

- **Driver’s time book.** Document belonging to the company, that registered the date and hour of the input and output of the truck from the forest and sawmill.

- **Log Book.** Book is kept in the security gate and details the truck input and output information. The following information is registered in the log book when a truck leaves the sawmill to the forest.

  - Exit date
  - Vehicle Number
  - Driver´s name
  - Time out
  - Gate pass
  - Destination

  When the same truck returns to the sawmill, the following information is added.

  - Log number for each species
  - Entry Date
  - Time in

  Additionally, the reception clerk registers in the book the waybill number and the species name.
With the approval of the security gate staff, the truck is sent to the log yard. The reception clerk carries out a visual inspection of the load and checks the LMCC. Subsequently, the logs are unloaded and the clerk measures the logs.

The re-measurement is as follows:

- **Diameters**: The clerk carries out two diameter measurements in each side of the log.
- **Length**: The clerk measures the length of each log.

The new measurements are registered on the back of the waybill and are handed over to the log yard supervisor. This register is used to generate the internal reception information. These are:

- **Daily Trucking report**. This gives details of the wood loads received in the factory, showing truck information, species, log numbers and volume, and their respective waybill number.
- **Daily logs stock chart-sawmill**. This report indicates the current wood stock by species available to process in the sawmill.
- **Daily logs stock chart- plymill**. This report indicates the current wood stock by species available to process in the plymill.
- **Daily logs stock chart-slicermill**. This report indicates the current wood stock by species available to process in the slicermill.

In addition to this, the reception staff carries out a check between the waybill and LMCC register, with the purpose of assuring the information coherence of both documents.

**Weaknesses:**

Principal weaknesses occur in relation to timber that is purchased from third parties in the city. These logs since they do not need to pass any control point are transported without an LMCC so there is no properly recorded information about their origins or of their volumes. As long as this situation continues it is impossible to verify that produce exported from the mills are of legal origin since there is no proper official record of input volumes. In addition a number of other weaknesses were detected which result in the failure of the paper evidence for integrity of the chain of custody even in situations where the timber is of legal and verified origin.

Some weaknesses were detected in the reception process, as such:
No check what-so-ever on legal papers of logs purchased from suppliers (LMCC) in the city.
The corresponding waybill is not always joined to the LMCC.
Reception checks volumes again based on different criteria. No feedback or measures taken when irregularities are detected.
There is no check to determine if the logs entering the mill from other sources are legal.

3.4.2 Measure study

During the field work a study was performed with the purpose of detecting possible differences between the log measurements carried out in the forest (registered in the LMCC) and those recorded in the sawmill reception.

The study consisted of the following. Ten logs that came from the Suhuma Reserve were randomly chosen. These were all logs which have been received in the sawmill during August. The consultant made a comparison of the diameter and length between the LMCC registers (which measurements took place in the forest and form the basis of the payment of royalties), and the register of the measures carried out in the log yard of the sawmill. In addition the consultant measured the diameter of each side of the log and the length of 6 of the selected logs.

In the following Table (1) a comparison between the length measure of each log carried out in the forest (LMCC) and the length of the same log measured by reception clerk in the sawmill log yard, are presented.

Table Nº1 “Comparison between the length of logs as measured in the forest and at the sawmill reception”
As shown in the Table, 70% of the selected logs showed significant differences (more than one meter) between the measurements carried out in the forest and registered in the LMCC and the measure taken at reception in the sawmill, presenting an average difference of 1.9 meters. The maximum difference observed was of 3.6 meters, between the length measures for the same log. In other word this study shows that the volume measure in the sawmill were over 15% more than those declared in the LMCC.

In the next Table (2) it is possible to observe the differences between the length measures in the forest (LMCC), in the log yard by company staff and the consultant measure.

Table N°2 “Comparison between length measures carried out in the forest, log yard, and by the consultant”
As shown in the Table, the measurements made by the reception clerk and by the consultant coincide in 100%. There is no difference between these measures. But there are differences between the measures carried out in the forest and the consultant measure. Consequently, the LMCC registers do not represent the real length dimensions.

With respect to the diameters, the study shows that there are not significant differences between the measures registered in the LMCC and those registered by the company staff. The average difference was 0.4 mm, without any tendency to under or over estimate the measurements. In Annex 5 is possible to observe the details of this study.

In the consultant measure, significant differences were not detected with the LMCC and Log yard register. In the case of diameter measures carried out in the forest, an under estimation of 0.3 cm was obtained compared with the measure done by the consultant. In the case of diameter measures carried out in the log yard an under estimation of 0.7 cm was obtained compared with the measure done by the consultant.

In short, the FSD officer failed to check the stated measurements. Lengths showed under measurements which are difficult to be verified while logs are on the truck since this would require a two man team of fit men in order to climb onto the truck and make the measurements.

**3.5 Factory**

The received wood in the factory is stored in log yards where is mixed with other logs from different origins remaining available for the production process.
Weaknesses:

In the sawmill process the following weaknesses were founded:

One important anomaly detected is that the wood tracking report on process recovery and yield do not make sense (Input-Output). Because in the yield process they consider the commercially useful volume instead of the total volume produced. This means that the factory considers only the export volume and considers the products commercialized in the local market and sawdust as waste products.

Other weaknesses were found, such as:

It is not possible to know how much and what products came from a given log. Main issue of concern is from tree to process log. Crosscutting at several stages without tracking.
4. REQUIREMENTS FOR AN EFFECTIVE WOOD TRACKING SYSTEM FOR LEGALITY ASSURANCE

The current wood tracking system in Ghana is too bureaucratic with too many documents and too many people involved, and the main problems detected in the field were:

- The system slows down log movements significantly (delay in issue of documents issued)
- Nobody in the chain from the forest to the mill is fully trustworthy.
- At best the officers of the Forestry Commission involved in the verification of the control system are failing to carry out the tasks assigned to them properly.
- Companies are liable to understate their volumes.
- Regulatory officials are vulnerable to corruption.
- Control systems must overcome the problem of trust.

We recommend that the new system for legality assurance is based on a simplified and less bureaucratic system. Two principal control systems will be required. Firstly complete stock surveys will be carried out immediately before that harvest and immediately after the closure of the compartment. The TUC holder will be responsible for payment for all trees removed during this period.

The principal control point for volumes will be situated at the mill gate. A duly authorised person will be located at every mill and will be responsible for measuring all incoming timber volumes of whatever origin. They will also be responsible for verifying the waybills in order to confirm origin etc.

Ideally the authorised persons should be from a third party organisation outside of both FC and the companies. This is the practice in Sweden and it has been found reliable and trustworthy by both mill owners and forest owners for almost 100 years.

Now the requirements for an effective wood tracking system for legality assurance for small and medium enterprises in Ghana are presented:

4.1 Pre-harvest Planning

In this phase the FSD should make an inspection in each compartment to carry out a marking with correlative numbers to all commercial trees with diameters greater than 50 cm. The marking process is carried out at the bottom of the tree with heat and rain resistant paint or some other permanent marking system which cannot be falsified.
The FSD should prepare a map with the precise (+-3m) geographic location of all marked trees in each compartment and a list indicating their species and diameters. It is important that both FSD staff and company staff are trained and competent in the interpretation of these maps.

4.2 Pre-harvest Inspection

The FSD staff should make a pre-harvest inspection in the forest, which will be done in the following activities:

- Check that all commercial trees have their respective stock numbers.
- Visual inspection with the purpose of detecting stolen trees.

Subsequently, the FSD will determine the trees to be harvested generating the yield list and map. These documents show the trees that the contractor will be authorized by the FSD to fell. The FSD gives the yield list and the map with the approval for harvest activities.

Later the contractor should carry out their own pre-harvest inspection, with the purpose of checking the yield list and map and must communicate to the FSD any anomaly found.

4.3 Harvest

The contractor will carry out the harvest of only the trees indicated in the yield list, identifying and felling the corresponding stock number marked by the FSD. Immediately after felling a tag is attached to stump and another attached to the felled tree.

The tag should fulfil with the following characteristics:

- Heat and rain resistant
- Cannot be removed without destroying them
- Correlative number in each tag
- Tags should carry encrypted information that prevents their duplication or falsification

Each tag will have the following information:

- Reserve Name
- Compartment number
- Stock number
- Tag number
- Felled Date
- Length (m)
Butt end diameter and the small end diameter (cm)

In Annex N°6 it is possible to see an example.

Additionally, this information is filled out in the Tree information Form (TIF). This is a document issued in the forest, and is completed with the harvest place (Reserve code, Compartment, etc), and characteristics and dimensions of the tree recently felled. (See Annex N°7). The tree information form will have a unique serial number.

After the crosscutting process (carried out in the forest or at the landing), a tag is immediately attached to each new log from the tree. The new tag will have the same information that the previous tags, only the log number and their new dimensions will be added (See Annex N°8). Subsequently, these new elements of each log will be registered in the TIF document.

In each TIF, the following characteristics should be presented:

- Correlative number.
- Issued by the FSD.
- The document presents a duplicate. The original copy is handed in to the FSD, and the duplicate is kept by the contractor.

When the truck is loaded the contractor issues the waybill the internal document that authorizes the logs to be transported from the forest to the sawmill. The waybill contains the following information:

- Company name
- Waybill number
- Origin and destination
- Vehicle number and driver´s name
- Date
- Species code
- TIF number(s)
- Stock Survey number(s)
- Tag number(s)
- Log Number(s)
- Logs dimensions (diameters and length)

An example of a waybill is provided in Annex 9.

The waybill is the only document that is carried to the sawmill on the truck.
4.4 Factory reception

We suggest that factory reception is carried out by staff belonging to a trusted third party organisation. These staff carry out the log reception in order to guarantee the information correctness and the wood traceability.

The staff should be located at the entrance of each sawmill or factory replacing the current measurement clerk employed by them.

The new staff must fulfil the following characteristics:

- A person from an organization independent to the companies and government department.
- Personnel rotation cycle (6 months)
- Knowledge in species and measuring

This independent trusted third part will perform the following activities:

- Logs Reception
  - Check the waybill brought on the truck.
  - Check the logs against yield map of FSD.
  - Carry out a independent measurement of each log (diameters and length)
  - Make a comparison between their measure and the records in the waybill.
  - The staffs do not accept differences higher than 5 cm in diameters measure, and differences higher than 20 cm in length measure.
  - If the measurements carried out by the staff agree with the recording in the documents, the reception is approved and the wood is entered into the sawmill.
  - If there are differences, the truck is not authorized to enter to the sawmill and the situation will be informed to the Timber Validation Department (TVD), carrying out an immediate investigation about the log origin.
  - The official measures are informed to the FSD and the company, this should preferably be done by immediately entering the information into a computer linked to a central database. If such a central database is properly designed then the information can immediately be made available to the company for internal stock control purposes.

traceability information of logs bought from suppliers or from other factories must be checked, checking their corresponding waybills to assure the legality of the wood.

4.5 Post harvest inspection
The independent staff periodically performs checks of traceability information of the logs received in the factories.

The staff should check in the forest that the trees received in the sawmill were indicated in the yield list, in other words, if those trees were authorized to be felled. The staff will carry out the following activities:

- Check the TIF information and if the form was properly filled in.
- Verify stump tag numbers against stock numbers.
- Verify that all felled trees have stock number and stump tag.
- Check that the stock number allocated by the FSD coincides with the tag information.

The independent third party will verify the following documents:

- Yield Maps
- Yield List
- TIF
- Waybills

All the documents should be kept tidy and securely stored.

Any anomaly detected will be immediately communicated to TVD. The staff keeps register up to date of any anomalies detected.

It is suggest that the TVD carries out a sample check of efficacy of post harvest stock survey with the purpose of detecting possible anomalies.
5. CONCLUSION

The current wood tracking system used in small and medium enterprises presents several deficiencies along its chain. Most importantly, the FSD staff is not present in the forest and does not check measurements, the checkpoints in transport do not check information properly, paper evidence is lost in many places, the post harvest checks in the forest are not effective and the documents are not stored in secured conditions and recorded in filing systems. On their side the companies fail to act in a legal manner and do not report infringements of their responsibilities when they occur. There is a clear and systematic abuse of the volume control and harvest control systems.

The above mention allows illegally harvested trees to enter the production stream and it does not give COC assurance to legal trees traded between companies in Kumasi, given as a result that the existing system is not working well.

The research done suggests major changes in the implementation of the present system are necessary, such as log tagging, independent measurement of volumes by an independent trusted partner and a post harvest stock survey to achieve an effective wood tracking system for legality assurance.
6. Annexes

Annex 1. Tree Information Form

<table>
<thead>
<tr>
<th>Species Code</th>
<th>Species Code Name</th>
<th>No. of trees recorded</th>
<th>Volume (cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRI</td>
<td>WAWA</td>
<td>3</td>
<td>22,214</td>
</tr>
<tr>
<td>ANT</td>
<td>KYENKYEN</td>
<td>3</td>
<td>60,462</td>
</tr>
<tr>
<td>SC</td>
<td>DENTYA</td>
<td>1</td>
<td>11,328</td>
</tr>
<tr>
<td>PET</td>
<td>ESSIA</td>
<td>2</td>
<td>26,893</td>
</tr>
</tbody>
</table>

**TOTAL:** 08 TREES

---

**Summary:**

- Hector Luch
- Dalila
- 02-08-2011

---

**Forest Services Division:**

- Company: LLC LTD.
- Property Mark: BIL
- Compt. #: 1184
- Reference #: FM 156 110 of 1981
Annex 2. Log Information Form

<table>
<thead>
<tr>
<th>Reserve Code</th>
<th>Stock Survey No. or Tree No.</th>
<th>Ctr.</th>
<th>Specie.</th>
<th>Trade Name</th>
<th>Code</th>
<th>Log No.</th>
<th>Log</th>
<th>Log Diameter</th>
<th>Volume (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>772</td>
<td>25</td>
<td></td>
<td></td>
<td>3</td>
<td>12</td>
<td>35</td>
<td>35</td>
<td>34.077</td>
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<tr>
<td>Cl</td>
<td>2130</td>
<td>26</td>
<td></td>
<td></td>
<td>6</td>
<td>12</td>
<td>85</td>
<td>85</td>
<td>14.521</td>
</tr>
<tr>
<td>H</td>
<td>776</td>
<td>26</td>
<td></td>
<td></td>
<td>4</td>
<td>12</td>
<td>58</td>
<td>58</td>
<td>12.152</td>
</tr>
<tr>
<td>M</td>
<td>2191</td>
<td>3</td>
<td></td>
<td>Chestnut</td>
<td>5</td>
<td>10</td>
<td>45</td>
<td>45</td>
<td>17.362</td>
</tr>
</tbody>
</table>

Total No. of logs recorded: 6

Contractor's Name: Pete Yeboda

SSC AMERICAS
Annex 3. Waybill issued in Suhuma Reserve

BIBIANI LOGGING AND LUMBER COMPANY LIMITED

LOG WAY BILL

Base: Suhuma
To: Kumasi

Mark: S1, S2, S3, S4

<table>
<thead>
<tr>
<th>Species</th>
<th>Logs No.</th>
<th>Length</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>21-1</td>
<td>S5</td>
<td>1123</td>
</tr>
<tr>
<td>S1</td>
<td>21-2</td>
<td>S5</td>
<td>1123</td>
</tr>
<tr>
<td>S2</td>
<td>20-1</td>
<td>S7</td>
<td>671</td>
</tr>
<tr>
<td>S2</td>
<td>21-1</td>
<td>S7</td>
<td>1626</td>
</tr>
<tr>
<td>S3</td>
<td>27-2</td>
<td>S2</td>
<td>1626</td>
</tr>
</tbody>
</table>

Date: 08-08-2010

Driver: Sulie Yakibu

(6) Logs Only

Miles Run: 8.5

Signature: 7.9.2010

(Received by:)

SSC AMERICAS

<table>
<thead>
<tr>
<th>Ref No</th>
<th>Reserve Code</th>
<th>Contract No</th>
<th>Stock No</th>
<th>Name</th>
<th>Species</th>
<th>DBH (cm)</th>
<th>DBC (cm)</th>
<th>DBT (cm)</th>
<th>DT (cm)</th>
<th>Length (m)</th>
<th>Vol (MC)</th>
<th>Defects Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I HEREBY CERTIFY that the measurements of the logs enumerated above have been duly taken and computed by me.

Property Mark Holder: [Name]

Authorised TID Officer: [Name]