Tracking systems and tropical forest products

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Label tracking in an Indonesian furniture factory.
Photo J.-M. Roda.

Ecocertification, ecolabeling, in addition to other communication tools using environmental and/or good management criteria, are theoretically designed to promote good management practices among forest resources through potential market sanctions or promotion. It is assumed that concerned consumers would prefer products associated with the best resource management practices. However, assuming that one piece of wood comes from a well managed forest is not helpful when it cannot be certified that the material will not be assembled or mixed with other material of dubious origin along the different stages of the supply chain, from the forest to the final consumer. Most ecocertification or ecolabeling systems, and other communication tools based on environmental and/or good management criteria, thus use at least two quality control tools or quality system tools. These are identification and tracking systems.

Identification of elements that compose a product allows to:
▪ avoid confusion during processing;
▪ avoid the use of elements that are defective or of dubious origin;
▪ facilitate access to information regarding these elements;
▪ localize them;
▪ identify the corresponding documents (design, supply, processing, inspection, control, recording of the results, etc.).

Some products may require an individual or collective (by batch) tracking system during processing or even throughout their life cycle. This allows to:
▪ know the origin of product components before and after major processing stages;
▪ find and delimit similar products which could have the same anomaly (e.g. illegal harvest);
▪ track products before, during and after processing in order to confirm the specifications, comply with the specifications, and identify bottlenecks within the process.

Principles

For timber industries throughout the world, tracking systems (and chains of custody, in a broader sense) have long been used, in various forms, for taxation and government revenues, financial management, quality control, etc.

Recently, chains of custody have been commonly used in conjunction with forest certification, providing a link between certified forests and products derived from them[1].

In principle, most tracking system methodologies are rather simple and easy to set up. The concept basically involves tracing the material from the felling of trees in a forest to the final product, including when the material goes through a primary processing facility such as a saw mill and the products from this mill go through intermediate processing stages.

It is just necessary to label (irrespective of the labeling system) the material, and re-label it each time it is divided, until assembly of the final product. By checking the label(s) at the end of the chain, the customer can know the origin of the material. Two dimensions of the concept have to be specifically addressed, i.e. tracking within a stage of the supply chain (e.g. milling process) and tracking between stages (e.g. from the forest to the mill). These different dimensions have different implications, since tracking within a stage essentially concerns industrial organization issues, and tracking between stages essentially concerns control and regulatory matters, and relationships between stakeholders in the forest sector.

[1] Cf *Technologies for Wood Tracking: Verifying and Monitoring the Chain of Custody and Legal Compliance in the Timber Industry.* DYKSTRA D. P., KURU G., TAYLOR R., NUSSBAUM R., MAGRATH W. B., STORY J., 2002. *In:* Environment and Social Development East Asia and Pacific Region. Discussion Paper. Electronic media, World Bank, December 2002.

Practice

In order to successfully implement this concept for each stage and throughout the supply chain:
▪ the regulatory environment should be suitable;
▪ the critical points and bottlenecks of the chain should be properly identified;
▪ the people, stakeholders and labour force of the chain should be known, as well as their motivations and involvement in the tracking system;
▪ the material should be properly identified, and segregated;
▪ the material quantities should be known at each stage;
▪ the information should be properly documented and recorded.

Environment

Regarding tropical countries, it is a fact that many of them have poor regulatory environments. And there is no country in which the forest industry is independent of the local social and political context. If the underlying system is corrupt, forest governance will probably also be corrupt.

In poor regulatory situations, no tracking system can ensure that the forests will be well managed as long as the associated incentives associated are too low to overcome the personal interests of local stakeholders in cheating the system. One of the reasons for the low success of ecocertification systems for tropical forests is the low market surplus relative to the comparative advantage of cheating the system.

From a practical standpoint, a tracking system in such an environment cannot be effective if it is not associated with a minimum level of economic incentives.

Key and hidden stakeholders

In situations where the social structure of the supply chain has not been correctly identified, no tracking system can ensure that a key stakeholder will not cheat the system or not block the efficiency of the chain. Similarly, assuming only that poor regulation according to Western standards is no regulation is a deadlock approach. It often means that there is a different regulatory system, with a different power structure and social redistribution than assumed. For example, only focusing on forest villagers or local tribes cannot ensure that the forest will be well managed or that the tracking will not be cheated if some local key or side stakeholders (e.g. a minor civil servant with power, or bridging economy and local societies, etc.) have been ignored and are out of the tracking system.

From a practical viewpoint, a tracking system in such a situations cannot be effective without including the apparent and hidden key stakeholders of the supply chain.

Basic workers, middlemen and members

In environments where the basic workers, small middlemen and small members of the supply chain contribute substantially to the efficiency, productivity or flexibility of the supply chain, but are not integrated or associated with tracking system decisions and redistribution issues, no tracking system can ensure that they will be sustainably induced to follow the system and participate in its improvement.

From a practical standpoint, a tracking system cannot be effective in such an environment without associating the basic people of the supply chain with the concerns and needs of the end users, nor without associating end users with the needs of the people of the chain.

Labeling

Most literature about tracking systems consider identification and labeling technologies as critical. This is because of a legitimate worry about the possibility that unscrupulous stakeholders might (or not) cheat the system by replication. However, this is an endless debate since each labeling system can be cheated, with the variable being the cost of cheating versus the economic advantage brought by this unscrupulous practice. Very logically, cheating is more expensive when the technology is more advanced, but implementation of this technology is also more expensive.

▪ A first problem involves this linear relationship, i.e. the more advanced technologies become comparatively less advantageous when scale economies and mechanization are more difficult to achieve. This fact drastically increases the comparative disadvantage of applying the most advanced technologies within tropical forest sectors, which rely to a great extent on manual labor, involving many different and non-standard steps.

▪ A second problem involves the fact that the most advanced technologies rely on scanners, readers, and field data loggers. However, so far, none of these items has proven its total operational reliability under tropical conditions[2] (weather, maintenance, spare parts, etc.).

The more advanced technologies, which are still totally unapplicable in all forest sectors, are smart cards, radiofrequency or micro-taggant tracers, chemical or genetic fingerprinting.

Different conventional technologies have already been successfully implemented in some cases (essentially temperate forest sectors), ranging from painted or chiseled labels, to barcodes and magnetic nails. However, all of them can be cheated, and most of them are hampered by practical problems when implemented in tropical environments. Bar-codes are often difficult to read in dusty, dirty, muddy or wet conditions. Up to 5% of the labels are lost during transport of the logs. In tropical countries, their use is therefore practically limited to the sawn timber, inside factories. Magnetic nails are expensive and difficult to remove from the logs before processing. They rely on readers and data loggers that do not always function properly in tropical forest conditions. They are therefore seldom used in tropical forest sectors.

Actually, when cheating can be prevented with sufficient incentives, implementation of a combination of painted or chiseled label systems from the forest to the mill, with conventional labeling (with bar-codes or not) systems used within the mill, has proven to be an optimal solution in most forest sectors.

Segregating and quantifying

Segregation is easy to implement in all situations, by simply identifying specific storage areas, well identified by flags or visible ground marks, and by devoting some process lines solely to processing traced materials. When a process line cannot be specifically devoted to traced material (e.g. in small workshops and industries), the process is segregated simply by separating it into phases devoted to traced and non traced material. Before and after each phase, the process line and machines should be thoroughly cleaned and the material perfectly arranged.

The quantities are easily documented if the labeling operations are properly executed, and if the documents accompanying the material are properly filled in (description, measurement, numbering, reference of the material) at each stage of the process, and if the documents are properly stored or sent to the following stage, according to the chosen procedure.

All of this relies on adequate personnel training.

Information

Manual paper-based systems combined with paint or chisel identification have often proven adequate when properly implemented. The information system based on it can be easily managed by efficient and transparent circulation of documents accompanying the material along the chain. The information system can be easily improved by data capture on computers from the first mill stage. Since the processes are very similar in different factories, it is easy to standardize the databases by applying the same standards at different stages or factories, or by computer translation of different standards from different factories.

Conclusion

Practical difficulties concerning implementation of tracking systems within the forest sector essentially arise because most operational approaches focus on identification and labeling technologies, and on information systems and computerization, but are too theoretical when considering critical points, people or stakeholders. However, if some key stakeholders are ignored or have few incentives, if the bottlenecks have not been taken in consideration, or if the regulatory environment is defective, even the best technologies and information systems will not help to successfully implement a tracking system.

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[2] An interesting experiment is nevertheless under way in Gabon, within the framework of a Canadian cooperation project: the system is based on bar-codes labeling logs, and on extra-hard-wearing data loggers.