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Tracking the trade: Increasing efficiency and transparency in Tanzania's timber sector

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Key takeaways

» Though reducing corruption was not an explicit initial objective, Tanzania's digital log tracking system, hereafter known as the Timber Tracker, has improved transparency along the transport chain of forest products in Tanzania. According to the Tanzania Forestry Service, the system has improved data capture and reporting and contributed to a significant increase in revenue collected.

» Interviewed officials and timber traders reported that opportunities for corruption in the timber transport chain have been reduced due to awareness of the system and its ability to check the validity of information about timber consignments.

» Government buy-in during the initial piloting of the system was essential to its successful adoption across the country. Through training and device purchases, the Forestry Service and relevant law enforcement agencies helped to ensure that forestry officers became familiar with the system.

» Some common technical challenges remain, however, which may create loopholes and reasons for some officers to avoid using the system. In addition, corruption can still occur in the initial permitting processes, prior to the timber entering the tracker system.

Key terms

» In the context of natural resource management, **traceability** is the ability to access the information needed for authorities, producers, and traders to verify claims (e.g., of legal origin) (Zain 2020). This information should ideally cover specimens and events in a supply chain from harvest to all subsequent transactions. Similarly, the FAO defines traceability as the ability to discern, identify, and follow the movement of a product through all stages of production, processing, and distribution (FAO 2017).

» **Corruption**, as defined by Transparency International, is the abuse of entrusted power for private gain. For this note, examples might include the forgery of documents to launder illegal forest products as "legal," bribery to ignore that forgery or other illegality, and extortion or collusion during inspections to avoid seizing timber.

Tracking timber in Tanzania

The forestry sector is immensely important to Tanzania, with a value greater than all other export crops combined and historical estimates reaching a contribution of 20 percent of GDP (FORVAC 2019, Green Advocates International 2014). However, corruption robs the Tanzanian government of much of the revenue it should receive, with historical estimates of up to 90 percent of due revenue being lost due to illegality and corrupt practices such as permit fraud (Milledge, Gelvas, and Ahrends 2007). Corruption also reduces the government's ability to effectively manage timber harvesting, undermining the sustainability of the sector (FORVAC 2019).

Timber tracking is one potential reform that could reduce some types of corruption along the timber value chain (Grant, Freitas, and Wilson 2021). Like in many parts of the world, methods of timber tracking and forest monitoring in Tanzania have typically been paper-based. Electronic timber tracking is a relatively new development, but one that offers many benefits (see Box 1). Several governments have piloted different digital traceability systems to improve timber trade controls and monitoring for legal and sustainable supply of forestry products. These include the International Tropical Timber Organization (ITTO)-supported system in Panama using electronic chips to track timber; the second generation Forest Information Management System (SIGIF2) system in Cameroon, the wood tracking system in Ghana, the Forest Inspector system of Romania, and many more.

Tanzania's Forest Act of 2002 regulates forest products and their harvesting and transportation. The Act provides the government with the legal authority to establish checkpoints along roads and highways to examine timber and its paperwork for authenticity. These checkpoints collect a variety of information to keep track of trader identity and the kinds of forest products transported. Among the product information recorded are volume, type, source, destination, and trader information. By law, any forest product that is not in compliance with the Act should be impounded or the responsible parties fined.

The evolution of the electronic timber tracking system ("Timber Tracker") in Tanzania started in 2016, initiated

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Box 1. What is an electronic timber tracking system?

Despite increasing sustainability concerns from consumers and businesses, it is still difficult to track the volume, species, and source of timber reaching markets. With global trade chains that are often complex and opaque, an electronic tracking system can track and record the physical flow of timber and timber products along the supply chain (ITTO 2012). Timber tracking systems can be used to address many of the limitations of paper-based systems such as:

» Limited data sharing, accessibility, and transparency,

» Lack of timeliness for monitoring and evaluation,

» Risks of forgery and other forms of fraud, and

» Risks of corruption.

Electronic timber tracking systems can link timber with attributes such as "sustainably sourced," "proof of origin," and legality verification. Governments can benefit from the system through increased control over their forest and timber sector, which could allow them to capture increased tax revenue, enforce illegal timber products entering the legal supply chains and implement measures to ensure sustainability. An effective traceability system may also help reduce abuse of documentation and corruption along transport routes and hubs (Zain 2020).

by the Tanzania Forestry Service Agency (TFS) and TRAFFIC East Africa. This development was driven by the joint desire to have reliable information on flows of timber to improve forest management and ensure that all due forest fees and taxes are captured. It was also driven by an ardent need ensure that timber entering the market is legally sourced and sustainably produced. See Box 2 for further details.

While the Tracker was developed primarily to improve data management and traceability, another outcome is its potential role in preventing corruption along the trade chain due to its improvement over the paper system. To see how the Timber Tracker in Tanzania may be helping to address corruption in the timber supply chain, TRAFFIC interviewed 30 officers based at TFS checkpoints, the TFS IT team, and others in law enforcement, as well as 18 traders. In addition, TRAFFIC carried out field observations on how the devices were operated during timber inspections and seizures.[2] Therefore, while this practice note does not provide a conclusive assessment on the functioning or anti-corruption impacts of the timber tracker, it does help understand potential improvements gained and share the experiences, views, gaps and challenges encountered and suggestions for further improvements of the frontline users of the system.

Box 2. Evolution of the timber tracker[1]

The Timber Tracker is the log tracking system used by TFS. It is integrated into the TFS Forest Resource Information and Management System (FREMIS) and is currently operational throughout Tanzania.

The Timber Tracker system was piloted from 2016 to 2019, at which time TFS officially introduced the system throughout the country. Several pilot phases took place, which evolved from encountering and adapting to challenges. While the system is officially operating, it is still constantly evolving and improving to address any challenge that may be encountered and to improve its efficiency and effectiveness.

The successful development and roll out of the system relied on the comprehensive engagement of TFS, who provided resources (both technical and financial), approval, and commitment to ensure the system was well-developed, operational, and integrated.
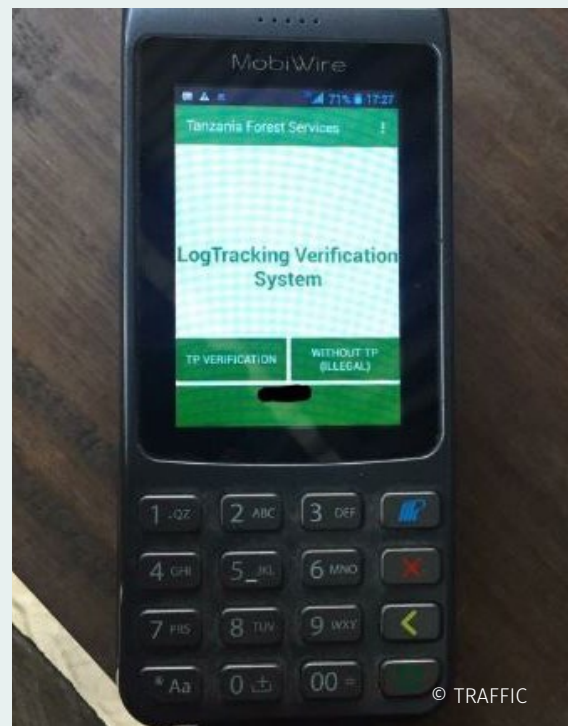

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Figure 1. The verification system as appeared on the screen of the device

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Opportunities for corruption under the paper-based system

Corruption facilitates the illegal wildlife trade (UNODC 2012) and results in weakening of governance systems, revenue loss to governments, loss of biodiversity and degradation of the resource, and impacts on local communities who depend on the resources in the wild. Table 1 shows the general corruption risks in the transportation of timber or other forestry products through paper-based systems.

Although efforts to develop the electronic system did not initially target corruption as a main problem, interviewees perceived the opportunities for corrupt activities taking place under the paper-based system to be higher, especially given limited transparency and the inability to check and validate information further along the supply chain. Specifically in the transportation of forest products in Tanzania, interview respondents[3] thought that the paper-based system provided greater opportunities for:

» trucks skipping checkpoint gates unnoticed;

» use of fake stamps, signatures, and other falsified documentation;

» transporting forest products outside the allowed hours;

» overloading or transporting undeclared products; and

» lower and/or avoidance of payments of royalties and fees.

In addition, if caught committing one of the above violations, then the possibility of a bribe to escape penalties was considered highly likely under the paper-based system, although it should be noted that some of these violations may also occur without involving corruption.

Electronic systems, like the Timber Tracker, have the potential to enhance transparency and accountability and reduce opportunities for corruption such as those elaborated above (Luijken and Martini 2014) if appropriately designed.

Table 1. Corruption risks in a paper-based timber tracking system

Corruption risk	Definition and examples
Documentation issues	» Forgery of documents (shipment origin, classification, value) to launder illegal forest products as "legal." » Approval of false documentation in return for a bribe or other benefit.
Inspection time	» Checkpoint staff demanding payments and threatening to slow processes unless benefits are offered.
Checkpoint avoidance	» Bribes or other corrupt actions to avoid inspections or skip checkpoints.
Checkpoint inspection quality	» Bribes or collusion to reduce supervision, carry out a partial inspection, or change the outcome of an inspection by reducing the quantity of seized products.

Source: Menocal et al. (2015), TNRC (2019)

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[3] Respondents were law enforcement officials from TFS based at checkpoints and headquarters, and traders.

How does Timber Tracker work?

The trader is provided with a harvest permit from the District Forest Officer (DFO), and the logger harvests the permitted trees.

To transport the consignment, the trader requires a transit permit (TP) issued by the District Conservator at the respective TFS district offices. This is where the Timber Tracker system starts. The TP is issued through the TFS FREMIS system which automatically sends TP information (i.e., dealer's details, vehicle, and consignment information) to the handheld Timber Tracker devices for accessing the information at the checkpoints.

At this stage, the trader is provided with a printout version of the TP that they should present to checkpoint staff during compliance checks. However, the checkpoint staff only rely on the printout for scanning the QR code to verify the TP and to access the information in the Tracker (although staff also sign the printout and write a verification code at the conclusion of the inspection – as a form of two-tier verification protocol).

After scanning the QR code, checkpoint staff inspect the consignment to ensure the cargo complies with the description provided in the TP and what is displayed on the Timber Tracker device. This comparison allows staff to identify undeclared products, overloading, falsified documents, and other violations.

After the inspection, the officer will then photograph the truck and the cargo from different sides, using the Timber Tracker device, and endorse clearance through the device. This generates the verification code which the officer then writes on the printed TP. The truck is then allowed to proceed to the next checkpoint, border post, or destination.

The inspection status report and pictures filed can be accessed immediately at the headquarters and along the transport chain, thus increasing transparency and discouraging any violation along the route.

The trader must go through each designated checkpoint allocated as provided in the TP. The checkpoints to pass through are designated by the District Conservator when issuing the TP and the choice is guided by the route the trader must take to reach the destination or border post (see table 2).
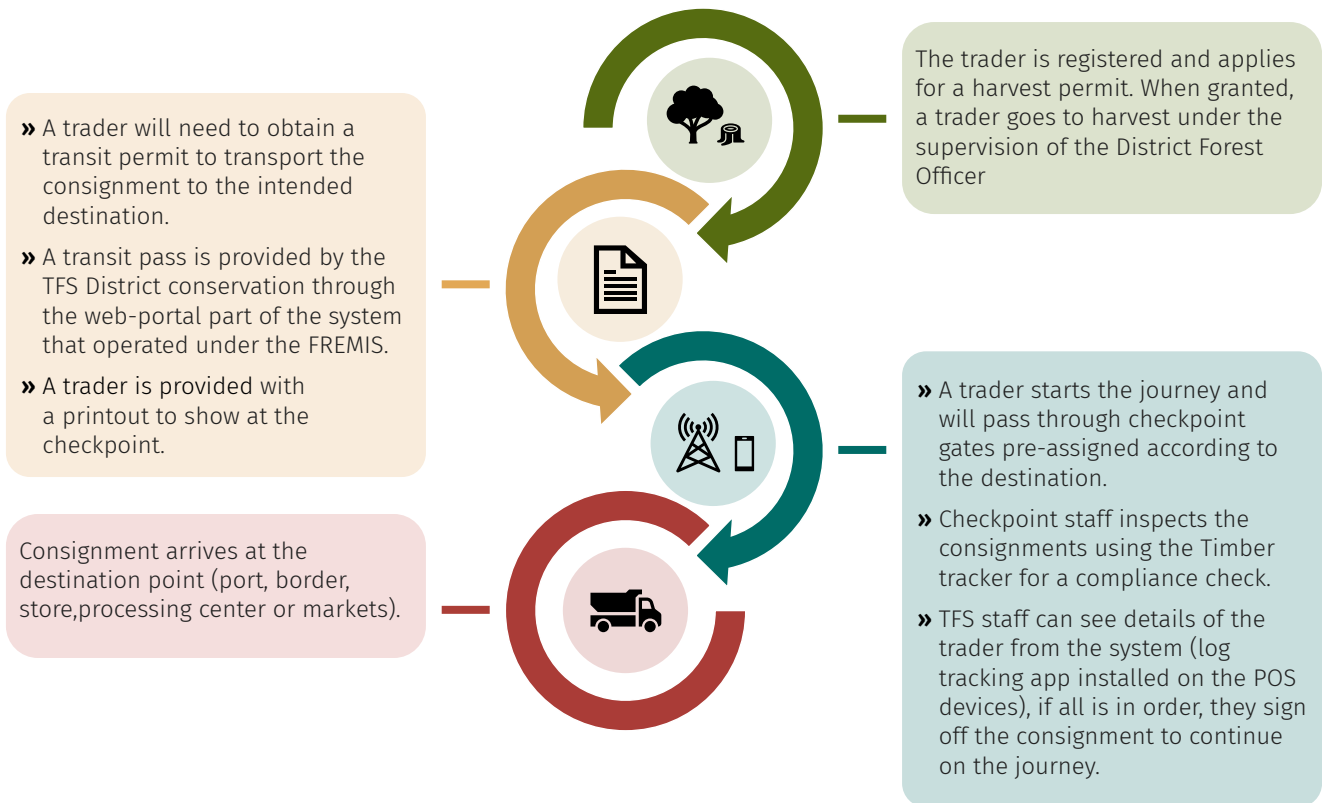

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Figure 2. A truck with timber consignment heading towards the checkpoint for compliance check

Table 2. Features of timber tracking in Tanzania

Feature	Description
Accessing inspection reports from other checkpoints	This option enables checkpoint staff across the transportation chain, and at the TFS headquarters, to access the inspection reports from previous checkpoints. This will determine if a trader has skipped a checkpoint. It would be very difficult for the trader to bribe checkpoint staff to ignore violations; unless everyone along the chain who can access that information is also similarly bribed; in addition to the headquarter's IT unit which also oversees the reports, any violation at one checkpoint will be noticed and reported.
Real-time data access at the TFS headquarters	The details of the inspection can be accessed immediately at the headquarters, checkpoint staff interviewed says this oversight makes them more careful in their job. The Timber Tracker system records the time taken for each inspection, reducing chances for prolonged discussions and negotiation between traders and checkpoint staff. Each staff at the checkpoint should have their own login credentials, which helps identify who inspected a certain consignment.
Touch screen selection of pre-made options to save time	To improve time efficiency during an inspection at the checkpoints, the system is pre-loaded with a list of information. This means the inspector at the checkpoint does not need to type information in, instead choosing from options provided. This also reduces discretion, to some degree, and reduces mistakes that corrupt actors could take advantage of.
Photographs of the consignments accompanying the data	Taking photos of the consignment at each checkpoint allows the data manager or other monitors at headquarters to easily detect if a consignment was offloaded or repacked during transport from the previous checkpoint. Hence, they can detect if anything suspicious occurred.

Diagram 1. Diagrammatic presentation of the Timber Tracker process

The trader is registered and applies for a harvest permit. When granted, a trader goes to harvest under the supervision of the District Forest Officer

» A trader will need to obtain a transit permit to transport the consignment to the intended destination.

» A transit pass is provided by the TFS District conservation through the web-portal part of the system that operated under the FREMIS.

» A trader is provided with a printout to show at the checkpoint.

» A trader starts the journey and will pass through checkpoint gates pre-assigned according to the destination.

» Checkpoint staff inspects the consignments using the Timber tracker for a compliance check.

» TFS staff can see details of the trader from the system (log tracking app installed on the POS devices), if all is in order, they sign off the consignment to continue on the journey.

Consignment arrives at the destination point (port, border, store, processing center or markets).

The Timber Tracker pilot: Did it work?

According to interviewees and field observations, the Timber Tracker has resulted in several improvements over the previous system. TFS reports that royalty revenue more than doubled from 2017 to 2021, which they credit at least in part to the reduced corruption opportunities due to the Timber Tracker's rollout (Chipanha 2022). While not without some challenges, the Timber Tracker has therefore potentially reduced some of the corruption risks with the timber traceability system, as shown in Table 3.

Table 3. Potential effects of the Timber Tracker on corruption risks

Corruption risk	Potentially addressed by the Timber Tracker?	Notes
Documentation issues	Partially	Corruption can still occur in the harvest permitting process or at the initial issuance of the transit permit. A weakness of many traceability systems, if a bribe is paid to procure a permit to illicitly harvest timber or to transport illicitly harvested timber, the Timber Tracker would not flag this issue (Grant, Freitas, and Wilson 2021). However, once the permits are issued within the system, they are transparent to all users. The system also limits the changes users can make to information on permits and keeps a record of the time and name of the officer logged in when any amendment is made.
Inspection time	Yes	The electronic systems save time over the paper system, and any abnormal delays in approval will be noted by the central IT unit monitoring the system.
Checkpoint avoidance	Yes	The record within the electronic system is transparent to everyone. Skipping a checkpoint will be apparent to TFS officers.
Checkpoint inspection quality	Partially	This cannot be easily addressed through the electronic system alone. The system can only show the consistency of records and verification from one checkpoint to another along the supply chain. If corruption occurs prior to the issuance of the TP, all details captured can be repeated at later checkpoints without raising a flag in the system. However, the photographic evidence of consignment at the initial inspection provides an additional level of descriptive detail to combat corruption along the checkpoints. Later checkpoints can report discrepancies, significantly raising the likelihood of any corrupt practices being detected.

What has gone well with the Timber Tracker in Tanzania?

Increased transparency

Transparency has increased among checkpoint staff themselves and, most importantly, to management at headquarters. On completion of every inspection incident, the information is immediately uploaded and can be accessed in the system. The headquarters office can then see the inspection status of each vehicle, time, and duration of inspection, who inspected the consignment, and any penalties or confiscations. Inspection results of preceding checkpoints can also be accessed by other relevant checkpoints along the chain.
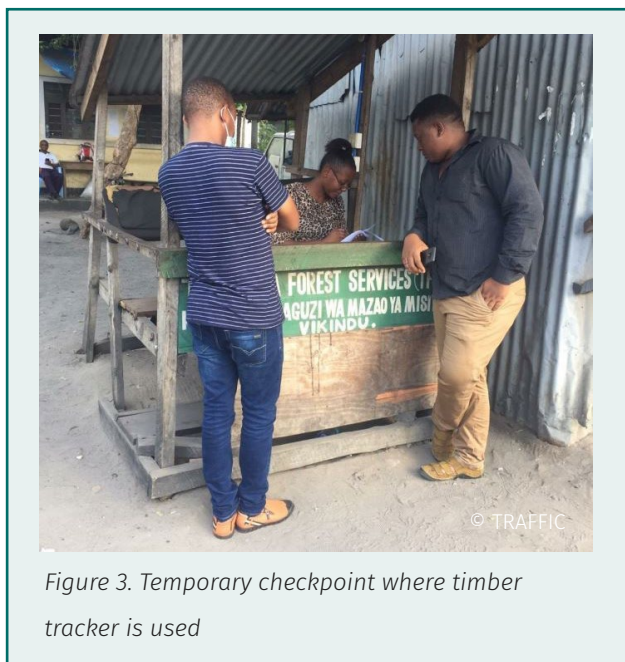
Figure 3. Temporary checkpoint where timber tracker is used

Reduced risk of trader use of falsified

According to interviewees, the rate of encountering falsified documents at the checkpoints from traders has fallen since the start of using the system. All necessary data are available in the system, and the trader's printed version of the transit pass is generated from the system and includes a QR code for verification.

Support to the checkpoint staff from the IT team

The IT department of TFS provides support to the field staff as required. There is an immediate response team available via an online platform that addresses any technical issues that may arise at the checkpoints. In some cases, the IT team conducts field visitations for support. Each checkpoint also has at least one person who attended a training-of-trainers session conducted before the official launch of the system. Therefore, although it is still a new system for TFS staff at each checkpoint, at least one staff can adequately operate the system and is supposed to provide support to others.

Time efficiency on inspections

Staff at the checkpoints reported being happy with the system and declared that the system has improved their work efficiency and performance. Time spent filling logbooks during inspection has been reduced, as all the information about the trader and the respective consignment are already available in the system before inspection at the checkpoint.
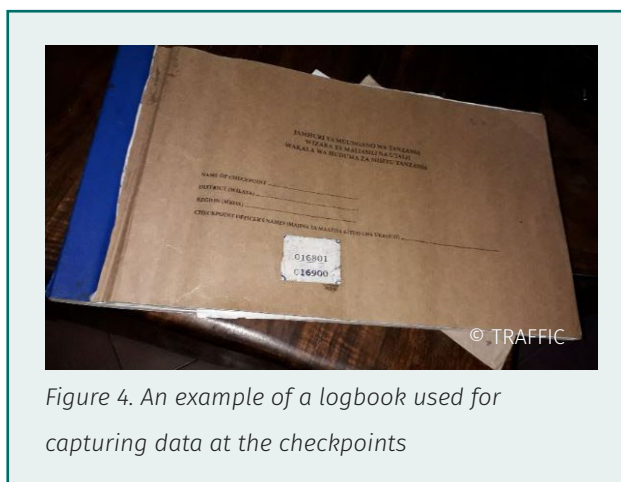

Figure 4. An example of a logbook used for capturing data at the checkpoints

What have been the challenges with implementing the Timber Tracker?

Technical skills with operating the system

During the field visit, some checkpoint staff were not able to operate the system appropriately. When asked, they responded that they had not been given training. This may indicate insufficient efforts for those who attended the train-the-trainers sessions to pass on knowledge to others, or it could simply be an excuse. While such a reason could be a loophole for corrupt activities, since the next checkpoint and headquarters can access the information, corruption seems like a less likely explanation.

Internet fluctuations and data supply

The major implementation challenge identified during the field visit is the complaint of the quality of the internet connectivity at some of the checkpoints. The lack of a reliable connection, in reality or as an excuse, could be used as a loophole for reverting to a paper system that enables corrupt activities.

Limitation of the coverage of the Timber Tracker

The main limitation to the Timber Tracker's anti-corruption potential is that it only covers the transportation segment of the supply chain. Corruption risks may still exist at previous segments of the trade chain, such as at harvest and allocation of harvest permits. However, TFS is expanding the system to extend coverage to harvest operations and other aspects of the trade not currently covered by the trackers (which is a strong indication that the system is highly valued to TFS senior management).

See Box 3 for examples of these challenges. **Note, however, that these challenges only occurred in a minority of cases observed**. Most observed transactions took place without challenges.

Box 3: Examples of Timber Tracker challenges from interviews and field visits

Case 1:

Staff who faced challenges with the system were asked why they did not contact the IT team for support. One of them remained quiet and another claimed they waited for their manager to contact the IT team, despite the availability of a quick response platform for support. This might indicate the unwillingness of the officers to use the system, or inadequate encouragement to do so from their management.

Case 2:

At one checkpoint, staff claimed that they do not use the device due to internet access issues at that checkpoint. The TRAFFIC team tried to access internet from their mobile phones and did not have any challenges. Hence, either the device is faulty or there is an unwillingness of the officers to use the system.

Case 3:

One officer anonymously expressed that some of the other officers would not support development of electronic systems as they were used to benefiting from loopholes arising from the use of the paper-based system.

Recommendations

From the evidence gathered, the Timber Tracker system has appeared to improve the efficiency of work at the checkpoints, along with transparency and oversight, reducing opportunities for corruption (e.g. reducing the ease with which documents or inspections can be falsified). However, the challenge remains at the beginning of the trade chain before the Timber Tracker enters the process. The verification of the harvest is not captured electronically, and transparency of data and information only starts when the transit pass is issued. As noted, this limitation is similar to many other traceability systems (Grant, Freitas, and Wilson 2021).

Therefore, TFS and other relevant stakeholders, such as law enforcement agencies, traders and communities living in areas adjacent to forests, still need to collaborate effectively to protect forest resources and ensure a sustainable harvest and trade. Such collaboration includes reporting to relevant authorities, where feasible, any attempt of corruption or illegality in the trade of timber and other forestry resources.

In addition, this report provides the following set of recommendations.

Recommendations to further reduce opportunities for corruption and improve performance:

» Although electronic traceability systems can enhance transparency and accountability and reduce the opportunity for corruption, these systems alone are unlikely to bring about transformational results. Such transformation requires coherent legal frameworks (procedures and regulations) that cover all stages of management, harvest, and trade, and sufficient investment in enforcement to support the system. Implementing those procedures and regulations will also require leadership, commitment, and capacity. Therefore, while the management of relevant government agencies should enforce the use of the Timber Tracker, they should also seek to identify and address other corruption risks in the system.

» Behavior change initiatives can help change the perceptions of checkpoint staff and improve their awareness and willingness to cooperate with management in combating illegal wildlife trade and corruption. Such initiatives may also focus on staff's willingness to accept change and adapt to changes of work modalities.

» When considering the deployment of tools like an electronic timber tracker, relevant authorities and supporting organizations should conduct a corruption risk assessment to identify loopholes and red flags of possible corruption throughout the supply chain. This assessment could provide recommendations on how to improve the system to minimize those loopholes.

» Private sector actors, such as companies and individual traders, are key in supporting the performance of the system and complying with it. The local trading and exporting companies need to ensure they immediately adapt to the changes introduced by the government and cooperate to play their part as required. Larger-scale buyers of their products should insist on such compliance before accepting shipments.

» Officials and supporting organizations should create or improve whistleblowing and grievance redress mechanisms for communities and traders. Violations will only be reported if it is safe to do so.

» Other law enforcement agencies, such as the Prevention and Combating of Corruption Bureau (PCCB), have a role in building awareness of the Timber Tracker among TFS officers, traders, and the communities. A PCCB endorsement of the utility of the timber tracker to combat corruption will send a powerful message to all stakeholders to support the implementation of the system. They should also support investigations and prosecution of illegal traders and corrupt officials.

Recommendations to TFS management to strengthen

the system itself:

» TFS should continue to assess the performance of the system, and collect feedback from the users, both traders and checkpoint staff, to improve the system.

» TFS should address some of the already identified challenges in the use of the devices, including internet connectivity that inhibit real-time data flow from some of the checkpoints.

» TFS can increase further support and training to officers on operating the system. This support should not be limited to just one officer undergoing training at each checkpoint.

» TFS will need to enforce the use of the system at all checkpoints to ensure that the potential benefits of the system are fulfilled.

Lessons to other countries that would like to develop an electronic traceability system:

» The Timber Tracker has shown promise for improving performance, oversight, and transparency. Despite the original idea coming from a non-governmental institution, TFS co-developed the system with them. This helped make the process effective by embedding the system within the management and IT systems of TFS and creating a relationship of support and ownership. This helped create a sustainable environment for the project, as TFS devoted resources to the development and improvement of the system.

» The development of the system should take place in stages or phases to allow for lessons and evaluation at each point. During the process, relevant stakeholders should have an opportunity to provide suggestions to improve the system while it is in development, instead of waiting for collection of comments after development is completed.

» Lessons and examples from other traceability systems piloted or implemented in other countries can help avoid repeated mistakes and adapt the good lessons to the local operational context.

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