



Tracing timber legality in practice: The case of Ghana and the EU

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ABSTRACT

The traceability of products has become an ever more important topic in global value chains because governments, producers and consumers wish to have in-depth information on the origin, quality, safety and sustainability of the products they regulate, trade or buy. However, traceability systems come with criticisms and challenges. This article describes how timber traceability is being realized in Ghana in the context of the Voluntary Partnership Agreement (VPA) between Ghana and the EU, which is part of the Forest Law Enforcement, Governance and Trade (FLEGT) initiative. Building on practice theory, this article conceptualizes traceability systems as ensembles of procedures, interpretations and activities. Empirically, it presents an analysis of the Ghanaian Legality Assurance System (LAS) and Wood Tracking System (WTS). Results show that the LAS/WTS moved from a 'digitalized regulatory track-and-trace system' on the design table towards a more hybrid one in practice, integrating elements of a communication governance mode and of a mass-balance model too, and keeping alive a parallel paper-based infrastructure. While particularly governmental officials are satisfied with the LAS/WTS, it is also important to recognize that stakeholders interpret aspects of the system quite differently, and deal with implementation issues on the ground quite differently, implying that 'legality-on-paper' and 'legality-in-practice' are not necessarily the same.

1. Introduction

The traceability of products and their qualities has become a prominent issue in global value chains (Baily et al., 2016; Caro et al., 2018; Moe, 1998; Mol and Oosterveer, 2015). Producers wish to minimize risks of buying low-quality materials; authorities want to know what products they import; consumers need to be sure that the products they consume are safe, healthy and sustainable; and the public at large has the right to be informed about what occurs – and, by extension, what producers, traders and authorities allow to happen – in global value chains. Consequently, ever more traceability systems are designed and implemented in ever more value chains. However, they come with criticisms and challenges (Gupta and Mason, 2014). Discussions focus on what should be made traceable, by whom and for whom, as well as on the question whether full transparency is possible and desirable (Cook et al., 2016; Turnhout et al., 2014).

This article describes the design and implementation of a traceability system for legal timber in Ghana in the context of the Voluntary Partnership Agreement (VPA) with the EU, which is part of the Forest Law Enforcement, Governance and Trade (FLEGT) initiative. FLEGT started

in 2003 and is an instrument that aims to reduce deforestation with a particular focus on combating illegal timber harvesting and trade (van Heeswijk and Turnhout, 2013; Nathan et al., 2014). Illegal logging is an important factor in deforestation. Between 15 and 30% of the world's timber is estimated to be illegally harvested and traded and estimates for individual countries like Ghana can be as high as 70–90% (Goncalves et al., 2012; Hansen and Treue, 2008; Kleinschmit et al., 2016). When countries sign a VPA with the EU, they promise to ensure that no illegal timber from that country will be exported to the European market. Currently, the following timber exporting countries are involved in such a VPA: Cameroon, CAR, DRC, Gabon, Ghana, Guyana, Ivory Coast, Honduras, Indonesia, Laos, Liberia, Malaysia, Republic of Congo, Thailand and Vietnam (<http://www.euflegt.afi.int/home>). Some countries are still negotiating a VPA with the EU (such as DRC and Laos); only one currently exports FLEGT-licensed timber to the EU (Indonesia); and most other countries, including Ghana, are somewhere in the middle of the implementation process.

FLEGT includes a full 'institutional package' at multiple levels and for multiple actors (Beeko and Arts, 2010). After signing the agreement, various other requirements need to be met in order to ensure that illegal

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timber is prevented from being traded. One of these requirements is the establishment of a Legality Assurance System (LAS). A LAS generally involves five main components: 1) a definition of legality; 2) a traceability system that is able to check the legality of sourced timber throughout the entire value chain; 3) a verification system to check compliance of stakeholders with the legal standard; 4) a licensing authority to label timber as FLEGT-proof, for recognition of legality in the value chain; and 5) an independent monitoring body to check the functioning of the LAS. Besides these 5 components of a LAS, two 'process-oriented characteristics' are often included in or added to a LAS: organizing participation of national and local stakeholders in the system and reforming legislation to ensure that national laws are consistent with (inter)national legality standards.

This article studies the design of the Ghanaian Legality Assurance System (LAS) and Wood Tracking System (WTS), analyses how stakeholders interpret and act upon these systems in the value chain, and identifies challenges ahead. As such, our analysis contributes to ongoing research about the implementation of FLEGT. Whereas many articles already cover this topic (for example: [Acheampong and Maryudi, 2020](#); [Hansen et al., 2018](#); [Maryudi and Myers, 2018](#); [Myers et al., 2020](#); [Overdevest and Zeitlin, 2018](#)), the link with the traceability literature is seldom made. A Scopus search on article abstracts dealing with FLEGT implementation produced 30 hits in July 2020, and only one of those explicitly included the issue of traceability ([Karsenty, 2019](#)).

Our second aim of the article lies in its theoretical and conceptual approach that builds upon practice theory ([Bourdieu, 1990](#); [Schatzki et al., 2001](#); [Shove et al., 2012](#)). By adopting a practice-based approach, our analysis complements the traceability literature, which has largely been dominated by managerial, organizational and socio-technological approaches, often ignoring or downplaying realities on the ground ([Cook et al., 2016](#); [Doddema et al., 2020](#)). The advantage of using a practice-based approach is, as we will explain in more detail below, that it highlights the interrelations between policies, people and things in a field of activity ([Arts et al., 2014](#)). Our analysis, thus, provides an understanding of how policy interventions and infrastructures are interpreted and acted upon in field situations (which may be offices, forests or check points in the field).

The structure of the article is as follows. The next section first discusses the literature on traceability, followed by the introduction of the practice-based perspective we used in our analysis. As part of our approach, we identify three dimensions for analysis: procedures, interpretations and activities. [Section 3](#) details the methods and [Sections 4–6](#) present the analysis according to the three practice dimensions. The article concludes by discussing the findings and drawing conclusions.

2. Analysing traceability

Traceability has been defined as “the ability to track a product batch and its history through the whole, or part, of a production chain from harvest through transport, storage, processing, distribution and sales (...) or internally in one of the steps in the chain for example the production step (...)” ([Moe, 1998](#): 211). What this definition highlights, is that traceability systems need to track not only the movement of products, but also what happens to these products in each of the steps in relation to agreed standards. Regulators, stakeholders and consumers are thus informed about the quality, safety and/or sustainability of the products concerned.

Studies of traceability have identified different governance modes, organizational models, and technical infrastructures of traceability. For example, [Baily et al. \(2016\)](#) distinguish three governance modes, depending on the actors addressed: management, regulation and communication. The first offers traceability among value chain actors only, from business-to-business in mutual interaction; the second to government or other regulatory actors with regard to each part of the chain; and the third offers traceability to consumers at the final end of the chain. Organizational models of traceability relate to how

commodities are traced in the value chain. [Mol and Oosterveer \(2015\)](#) distinguish four such organizational models: 1. track & trace, 2. segregation, 3. mass balance and 4. book & claim. In the first model, the commodity is uniquely identifiable by the processor, regulator or the consumer. For example, the wooden product can be directly tracked and traced to the timber it originated from, to the log the timber was milled from and even to the stem in the forest where the log was cut. In the second model of segregation, volumes of certified products – for example sustainably produced soy – are segregated from non-certified products, but the final products offered to consumers may stem from various certified sources around the world. Consumers can thus no longer track and trace the product they bought to the original location, but they are assured that it was produced in a sustainable way. The third model of mass balance is even more anonymous. Here, the share of sustainable products in the total volume of products is monitored throughout the entire value chain, so that it can be checked whether it remains the same. Processors, regulators and consumers are guaranteed that a certain percentage of the product volume was sustainably produced. The fourth model of book and claim fully decouples the trade in products from the trade in certificates. For each unit of sustainable product, a parallel certificate will be booked and traded. Now, if a trader down the value chain wishes to sell the product as sustainable, he/she also needs to buy a certificate on the market.

To make these different governance modes and organizational models of traceability operational, they need to be translated into different technical infrastructures, including data channels and ICT solutions, that guide the production, storage and disclosure of information about commodities and supply chains ([Caro et al., 2018](#); [Gardner et al., 2019](#); [Hu et al., 2013](#); [Senneset et al., 2007](#)). What information is produced, stored and disclosed is partly derived from the standards that apply and that commodities and value chains have to comply with. However, as literature about environmental auditing has demonstrated, the interpretation and enactment of these digitalized standardized systems is anything but straightforward because standards have to be reconciled with real world complexities ([Eden, 2008](#)). However, the practical challenges that are involved in making these systems (do) work often remain hidden ([Cook et al., 2016](#)). Therefore, our article complements the current focus in the traceability literature on modes, models and infrastructures with a practice-based approach ([Doddema et al., 2020](#)).

Since the early 2000s, social theory has made a turn towards social practices ([Schatzki et al., 2001](#); [Behagel et al., 2019](#)). This focus on practice is important to address the limitations of structuralist and institutional theories in explaining individual action, because it is attentive to what people actually do and say ([Ayana et al., 2015](#); [Bourdieu, 1990](#); [Cleaver and de Koning, 2015](#)). At the same time, practice theory is a response to the limitations of methodological individualism, because – instead of considering agency as an attribute of autonomous, free-willed individuals – it considers agency to be situated, contextual, and relational ([van der Arend and Behagel, 2011](#); [Wagenaar, 2011](#)). To analyse practices, we therefore need to understand not just the relevant social norms, rules and procedures, but also how actors interpret and act upon them ([Schatzki et al., 2001](#); [Wagenaar, 2011](#)).

Practice scholars have proposed several dimensions or aspects to analyse this intersection between concrete actions and social context, and the norms, rules, and procedures that are part of it, using concepts such as situated agency, meaning-making, or performativity ([Arts et al., 2014](#); [Bourdieu, 1990](#); [Hajer and Wagenaar, 2003](#); [Schatzki et al., 2001](#); [Shove et al., 2012](#)). In this article, we use the following three dimensions of practice: 1) *procedures*, which refer to the formal designs, regulations and rules of traceability systems; 2) *interpretations*, which highlight how procedures assume practical meaning as stakeholders interpret them; and 3) *activities*, which point to how stakeholders put traceability into practice. This three-dimensional practice-based framework will thus guide the analysis of the timber traceability system in Ghana below.

3. Methods

This article uses a case study approach (Crowe et al., 2011; Heukels, 2018; Yin, 2009) that – contrary to surveys or experiments – allows for in-depth, multifaceted explorations of complex issues in real-life settings. Hence, a case study approach is well-suited for a practice-based analysis we propose in this study. Our analysis is based on three data sources.

First, we have analyzed about 60 official policy, procedural and instruction documents and presentations that present the legal standard, its assurance system, and the wood tracking system in Ghana.¹ These documents are used by the different VPA officials to learn about the standard and these systems, and to execute their formal tasks.

Second, our analysis is based on 20 in-depth interviews with key stakeholders involved in the VPA implementation process: 13 with government officials, 5 with civil society representatives and 2 with industry representatives. This sample reflects a deliberate focus on government officials since they are responsible for the actual implementation of the LAS/WTS, whereas private actors are supposed to be consulted during this process, as the VPA stipulates. The interviews were conducted during fieldwork in Ghana in November and December 2017, and were based on a semi-structured interview guide. Eighteen interviews have been recorded with consent of the interviewees, and those recordings have been transcribed verbatim. Extensive transcripts have been made based on written notes from those two interviews without recording.

The third data source was ‘participatory observation’ by the second author in a 3-week field audit performed by the Forestry Commission (FC). During this audit, the researcher was present as an independent observer. He had access to the entire audit, could speak to the stakeholders, and could also undertake short interviews with them. The results of this part of the data collection were reported in a field logbook. These participations and observations have contributed to a much deeper understanding of the VPA implementation in practice.

The interview data transcripts were analyzed using MAXQDA Standard 2018 data analysis software (MAXQDA Standard 2018, Release 18.0.7, Version 2016-02-01). Documents were analyzed by hand. Both were done according to the technique of ‘qualitative coding’ (Wester, 1991). This means that within the transcripts the researcher looked for items and quotes that could be distinctly coded – in accordance with the research aims and theoretical concepts – and thus be put in different (sub)categories. While doing so, theory and empirics were aligned into an in-depth analysis.

4. Procedures

4.1. Wood tracking system

The traceability system of legal/illegal timber in Ghana is labelled the ‘Wood Tracking System’, or WTS. It follows logs and wood through the entire value chain, from tree to domestic use and from tree to export. Crucial for the WTS are the so-called Critical Control Points (CCPs) in the value chain, that all logs/wood have to pass. At each of these CCPs, forest officials check whether logs and wood can still be considered legal, in that all procedures and practices of harvesting, transport, trading and processing are executed according to Ghanaian forest law and VPA’s legal principles. CCPs are for example related to the source of timber, timber rights, tree felling, log transport, logs arriving at plants, log processing, and the export of processed wood. Formerly, legality was checked through article documents, but currently, with the WTS in place, all required steps in the value chain are also digitally ticked off

¹ These policy documents are archived at Wageningen University, the Netherlands, and only accessible after approval of the authorities concerned. For more information, please address the first author.

through an electronic platform.

Originally, a fully digitalized ‘track-and-trace system’ was designed by an international software company for the new WTS, including a GPS system to identify individual trees and their location in the field as well as digital barcodes to be attached to both stumps and trunks, but the design has been adapted over time (Overdevest and Zeitlin, 2018). First, GPS identifiers and digital barcodes turned out to be not feasible for technological, financial and practical reasons, the latter being related to fact that many of Ghana’s forests are in poor and remote areas. Trees now receive a physical tag; a unique number that is curved in the stump and painted on the log, and that is registered both on paper and electronically in the WTS. Second, ‘track and trace’ of individual logs is now only *partly* guaranteed after the processing plant. The first reason why this is the case is related to the need to incorporate plantation trees that, in contrast with trees from natural forests, lack an individual code and are only tagged according to the forest *compartment* they stem from. The second reason is that in many cases, logs of different geographical origins end up in single bundles of lumber. Therefore, the input of legal logs and the output of wood from each sawmill is continuously monitored by companies to check whether inputs and outputs are the same in volume (minus acceptable losses in the processing). In this way, officials are able to check if illegal logs have been added to the input of the mill. This demonstrates that the WTS has incorporated elements of a mass-balance model of traceability.

Although originally planned as a fully digitalized system, the current WTS is still partly paper-based. The main reason is that internet connectivity is a challenge in Ghana; internet coverage is not always guaranteed or it can be very slow. This is a major impediment to data collection and monitoring. Moreover, due to power outages, the servers that should provide the country with an internet connection have not always been able to provide a reliable and stable connection. This creates difficulties for the synchronization of data and can even result in data losses when the WTS database goes offline. For all these reasons, the WTS continues to rely on paper documents as a fallback option. Recently, though, these problems have been reduced through the installation of solar panels and internet boosters at regional FC headquarters, thus better guaranteeing continuous access to the digital WTS (Overdevest and Zeitlin, 2018). At the same time, power supply is becoming ever more reliable in the country.

4.2. Legality Assurance System (LAS)

The WTS is part of the broader ‘Legality Assurance System’ (LAS) of Ghana (see Fig. 1). Legality is defined as adhering to seven legal principles related to source of timber, timber rights, harvesting operations, transportation, processing, trade, and fiscal obligations. These principles not only include legal requirements for logs, timber and wooden products, but also social and environmental safeguards, like respecting labour rights and avoiding water pollution and forest disturbances (see Section 4.4). If all legality requirements are fulfilled and confirmed, the TIDD (Timber Industry Development Department, which is part of the Forestry Commission of Ghana (FC), which, in turn, is part of the Ministry of Lands, Forestry and Mines (MLFM)) may issue a FLEGT-licence and an export permit. So far, no FLEGT-licensed timber has been exported from Ghana to the EU, except for a trial shipment to Rotterdam in 2019. The fact that licensing is still lacking, 10 years after the VPA agreement was signed, clearly shows that the implementation of the LAS is a complicated matter.

In addition to legality control in the value chain itself, the LAS also includes two verification entities: the Timber Validation Department (TVD) of the Forestry Commission and Independent Monitoring (IM) by third parties. The TVD performs two functions. First, it serves as the key unit of data analysis related to timber legality along the value chain; and second, the TVD serves as auditor and routinely verifies the compliance to the legal standard in the field. The TVD is in turn monitored by the Timber Validation Council that consists of a broad range of public and

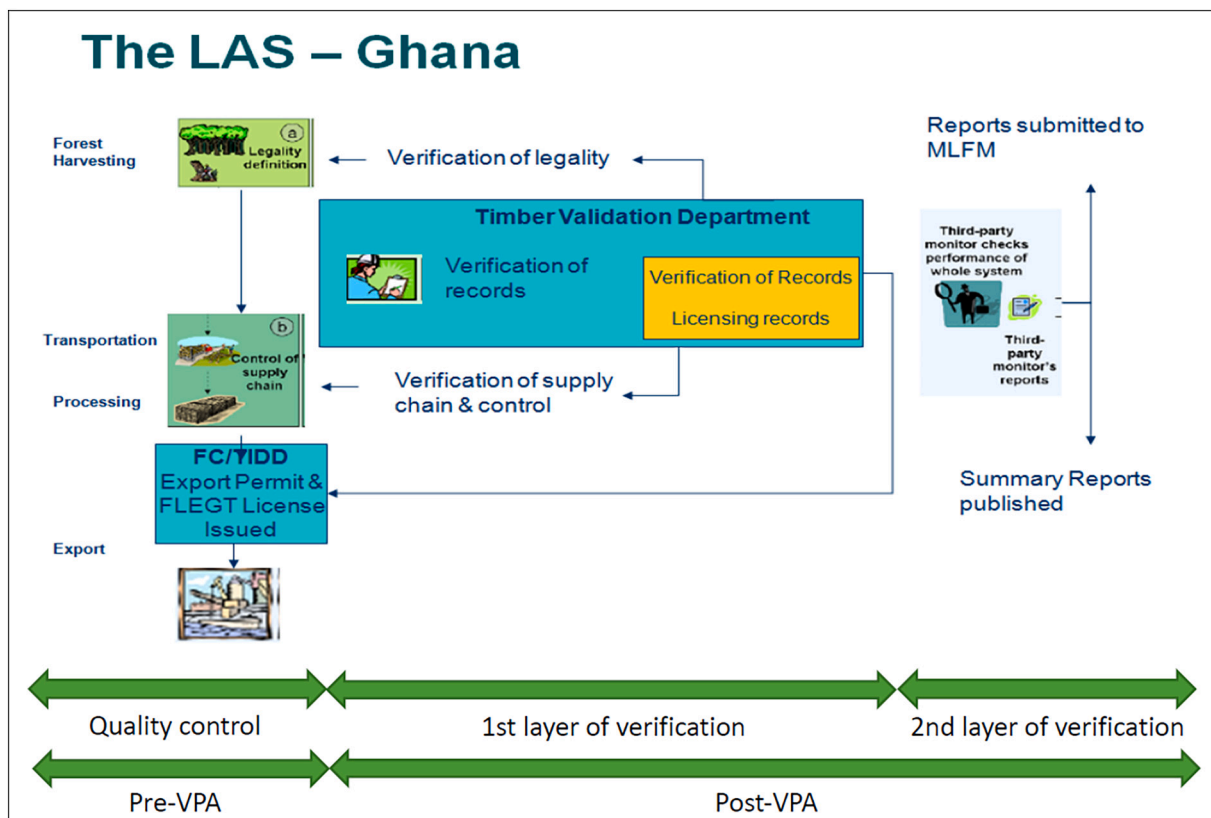


Fig. 1. The structure of the LAS (source: Heukels, 2018; adapted from the EU-Ghana VPA, 2010, Annex V).

private stakeholders. Besides monitoring the activities of the TVD, the council also deals with external complaints about timber validation. The second layer of verification is the Independent Monitoring (IM). It consists of independent third parties and it monitors and reports on the functioning of the LAS as a whole with a particular focus on key players like the TVD.

In addition to these verification entities, the VPA is reviewed by the external Joint Monitoring and Review Mechanism (JMRM), which consists of both EU and Ghanaian representatives. The JMRM conducts regular joint missions to review the effectiveness of the VPA as a whole, and it publishes annual reports on implementation, legality enforcement, and FLEGT licensing.

4.3. A transparency system?

The IM layer in the LAS touches upon the issue of transparency, because in-depth information on the timber value chain should be made available to third parties outside the forest sector in order to allow them to play their roles as verifiers of legality. The disclosure of this information is, however, politically sensitive; ministries and companies are not always eager to share information with outsiders, and particularly with critical NGOs. The topic of transparency is addressed in the EU-FLEGT architecture, but, unlike more recent VPAs with for example Vietnam and Honduras, the Ghana VPA lacks a specific section or Annex about transparency. In the Ghana VPA, the commitment to transparency is nonetheless included in the TVD and JMRM: The TVD has built a web-based portal (<https://ghanatimbertransparency.info/#/home>) through which third parties can have access to VPA data, and the JMRM provides transparency by making all their mission and review reports publicly available. Moreover, the government of Ghana recently issued a regulation that obliges the Forestry Commission to make information on forest management and legality available to the public, both on its website and on request (Timber Resources Management and Legality

Licensing Regulations, 2017, LI 2254, regulation 76).

4.4. Social and environmental safeguards

As explained previously, the legal principles refer not only to timber legality but also to social and environmental safeguards. Already during the early design process in the late 2000s, provisions were put in place to address the potential adverse impacts of the VPA on local communities and the environment. These were referred to as 'safeguards'; a concept that originated from World Bank and UN policies from the 1980s and that underscores the importance of preventing or mitigating undue harm from development interventions, for example through local participation processes, the acknowledgement of land and forest rights, or benefit sharing arrangements (Tegegne et al., 2017). In the context of the Ghanaian FLEGT/VPA process, the social safeguards approach has particularly focused on chainsaw lumbering, which is forbidden by forest law but continues to be practiced by locals. Thus, the VPA has resulted in the 'criminalization' of these local practices. According to our respondents, this has had two main consequences. First, NGOs introduced artisanal milling using small-scale saw mill facilities as an alternative to chainsaw lumbering. Second, the VPA reconfirmed the Social Responsibilities Agreements (SRAs) that had already been established in Ghanaian forest policy in 1977. According to these SRAs, companies are requested to share part of their revenues with local communities in order to avoid forest conflicts and to bring additional local income. However, these two strategies to ensure safeguards are generally considered insufficient to solve or avoid such conflicts or to seriously address vulnerabilities of local communities with regard to forest rights, use and income (Hansen et al., 2015; Hansen et al., 2018; Myers et al., 2020).

The social safeguards approach has also focused on labour conditions in the wood processing industry. Employees should be paid well, in accordance with legal standards, and their safety should be guaranteed, for example through special equipment in mills (shoes, cloth, safety

glasses). Environmental standards are also key to the VPA. Here, one might think of the safe use of chemicals and the quality of waste water that runs from the factory into the environment.

5. Interpretations

5.1. Overall, stakeholders are quite positive

In general, our interviewees – mainly representatives of government, some of companies and NGOs – are positive about the introduction of the LAS. They refer to enhanced digitalization, synchronization, reporting, verification and harmonization of data and rules as positive aspects. For example, the introduction of the WTS has provided a positive change in data collection practices, according to FC staff. Nowadays, they use handheld computers which, when connected to the internet, process and synchronize the collected data directly to the WTS database.

It's a good system, because right now, we are running away from paperwork. (...) Those days, the supervisor used to go to the field, pick physical data, measure diameters, take a reckoner, and try to calculate the volume per tree. But now, (...) the system has got an in-built calculation system, so you just put the diameter, the length and you get the volume.

The strength of the WTS also lies in the synchronization of all the information gathered by the FC. All data that is collected and all documents that are issued are made available on the WTS, providing an overview at a glance.

One of the good points is that, because it's in the system, we are able to synchronize all the information gathered. (...) And with the system, if it's working perfectly, especially at our checkpoints, when you enter the details of the trees in it, it will lead you to the source. So, it's to help you to determine whether the logs are coming from a legal or illegal source.

The WTS also provides the possibility for FC managers to automatically generate reports. Instead of collecting data by hand and going through all relevant documents, it is now possible for them to instantly create the report by clicking just one button. Also, instead of having to deliver everything on paper to relevant offices, managers can collect the necessary information on distant offices from their desks through the WTS.

Writing reports was giving challenges to most of the staff, but now the system itself generates these things. (...) Before, you had to travel all along to the regional office to submit your report. But now, (...) the regional manager will also have access to the system. So, the reporting and traveling and all those things are now over.

More visibility in the timber value chain has positively affected the work of not only the FC but also the timber industry. The electronic synchronization of data has given the industry more insight into their own production process. Initially, they weren't all too happy with the idea of creating this level of visibility of their activities, but it has helped them to learn now things about their own operations.

When we started the whole VPA program, industry was very apprehensive about it; they thought it would disturb their work and bring higher costs per unit for them. But then, once the law was there, (...) some industry players are telling us that it is helping them to also track their costs. Yes. Because the field men could be doing things outside their view, but now it's showing up.

The WTS has increased visibility of timber-related practices, which has resulted in higher exposure of illegalities. Every non-compliance or anomaly that enters the system is immediately marked with a 'red flag' which urges the attention of the responsible managers.

The system is such that there is an in-built mechanism which will betray you. (...) The moment red flags raise their heads, they suggest that something has gone wrong. So, it is (...) to make the theft of timber unattractive. It will be unattractive, because even if you succeed in doing so, the system will betray you along the path. And therefore, (...) the biggest advantage is about the security and the integrity of the resource. (...) You cannot hide.

So, adding illegally acquired timber to the legal systems has become much more difficult. This has tipped the scales in favour of doing business legally and people are starting to realize this.

We have seen, people have really seen, that the rules of the game have changed. So at first, you could do a lot of manoeuvring and just write anything, but you can't do that now, because with the WTS in place, any information that has been populated from stock survey, up to whatever stage, up to where the logs are measured, it's easy to verify that. It's so easy to verify that, so you don't have the situation of, okay, it's no longer with me, I don't have copies, it's here, it's there, you know, we don't have that situation anymore.

This situation is strengthened by the 'double' verification practices in the LAS: the TVD and the IM.

One way or the other, even if the TVD audit fails to bring it up, the independent monitor will bring it up, and observers, civil society, we are also observing, and we are looking at how things are being done.

On top of that, the TVD or IM check-ups are carried out randomly. The idea that your work can be put under the microscope at any time makes going around the system even more difficult.

Everybody can come at any point, so they are aware of that. (...) It makes them more careful, that anyone can come, and report, and it can cause problems for them, so it makes them be on the lookout and more careful.

Also the EU, who is a partner in the FLEGT/VPA and an investor in its implementation, is watching, and expecting results.

The whole world is watching. More so because the whole project is being sponsored by the EU. The European Union is looking at what is happening here, so that their contribution has succeeded. (...) And whatever investments have gone into it, would have been used as a good resource. That is what they are expecting.

Finally, the LAS has, according to stakeholders, also enhanced legal reform and good governance.

Through the VPA, we have been able to improve (...) legal policies. For instance, some of our laws were conflicting, but through the VPA we have been able to come out with an overarching Legal Instrument that has harmonized all the laws.

5.2. Same words, different meanings

Although stakeholders seem to agree on what the LAS and legality are all about, and that these have already induced positive changes in forestry in Ghana, there are differences in interpretation as well. Two stand out: the definition of an 'illegal act' and the 'degree of transparency'.

If you are not complying with any aspect of the standard, then it's an illegality. So, non-compliance to any of the requirements basically is an illegality.

For this stakeholder, illegalities are basically the same as non-compliances. So, any non-conformity between the log and the Legal Principles makes the log illegal. By contrast:

Illegality in general should, to me, refer to doing things completely outside the system. (...) You have not even attempted to do a single step of the system. You have no permit and you are felling. That is totally illegal. But non-compliance is that you fail to adhere to certain requirements within the legality system. That is what non-compliance is."

This perspective shows another interpretation of legality that refers specifically to the permit and the yield. So, if a logger is felling without a permit, or with a valid permit, but outside the allowable yield, this would count as an illegality. However, if the permit is correctly acquainted and executed at the forest floor, but certain aspects of other activities down the value chain are not being done correctly, for instance transportation, processing, or following environmental standards, it would count as a non-compliance. These two interpretations of illegality have huge consequences in practice; how serious will certain acts be judged or sanctioned depending on whether these are considered as illegalities or non-compliances?

A second issue about which multiple interpretations exist is the degree of transparency. NGOs advocate the full disclosure of the WTS; they want to see how the logging, processing and export industries are performing regarding legal compliance.

It can be so open. Except for trade secrets or contract details, that is okay, but the nature of the contract, the types of non-conformances that have been identified, corrective action requirements that have been raised, how responsive districts are, (...) can we know what has been the 'close out rate', where sanctions had to be applied?

Other stakeholders have reasons for not having the system as open as the NGOs want it to be. To them, the information within the WTS is sensitive because it is connected to particular interests and confidential data. Unrestricted access to such information is therefore seen as risky. These stakeholders fear that transparency can be misused to deliberately frame 'legal acts illegal'.

They have access to the system, but they are asking for more, which is dangerous for everybody. (...) They see that the contractor has been given thirty trees to fell. Out of these thirty trees, the contractor has cross-cut about sixty logs. You start counting the logs as trees. You see, the moment the contractor unloads about sixty logs, hey!, that contractor was given thirty trees, but he has felled sixty. Just to cause a concern, or, you know, maybe don't like the contractor.

Moreover, the information generated in the WTS can be difficult to understand and situations can be interpreted in many ways. For example, the WTS creates red flags when discrepancies occur within the system, but it does not provide a decisive answer on who caused these data discrepancies.

Well, a red flag is a red flag. So, when it materializes, one must deal with it. (...) Let me give you an example. In the audit, one recurring red flag that we must deal with, is the harvesting of undersized trees. (...) So you issue a warning, or corrective action requirement, to the contractor, who felled the tree. And then he tells you that, yes, I've felled this tree, but you gave me the yield. So, the red flag is no longer for him, it is for the guy [FC official] who gave the yield, who is one of ours.

In this situation, the red flag was connected to the logging operator, but was actually caused by official measurement errors. These misunderstandings make the FC reluctant to support the full disclosure of the WTS data. They first need to reconcile all the information themselves before they can conclusively issue warnings or corrective actions. So, if that information would be publicly accessible, the integrity of the logger is potentially endangered. According to the FC, the public availability of the audit and corrective actions reports, in which the dust has been cleared around red flag situations, already provides NGOs with all the

necessary information.

5.3. Reluctance

The WTS aims to (partially) replace a non-digital, paper-based system. Although the FC now recognizes the benefits of digitalization, this was not the case in the beginning. This is not so surprising since such digital technologies are new to the forestry sector.

You know, some people fear, they have a phobia for technology. So, introducing IT to existing processes, like, you know (...), some of them say, I don't even use a phone for Whatsapp, so why do you want me to force to learn this thing, so that's it.

Especially the older staff members within the FC had a hard time adjusting to the new electronic system. A great deal of (informal) training in computers and software was needed to help everyone understand the WTS and how to work with it.

Besides technical phobia, there are other potential reasons for reluctance, for example the fact that digitalization reduces opportunities for 'informal payments'. We have no clear indications that this is the case since respondents are generally not very eager to talk about this issue.

6. Activities

6.1. The field audit

So far, we looked at the LAS and WTS procedures on paper as well as their interpretations by key stakeholders. But what is happening on the ground? What, if anything, are people doing differently? It should be noted that the systems are quite new and in their early stages of implementation. Even so, the FC had not been able to issue FLEGT licenses so far (early 2021). Thus, it is too soon to assess their overall performance. Yet, some new activities could be identified. One of the authors was able to participate in a field mission of an auditing team from the TVD (see method section). Such a team audits the timber value chain in a certain district and checks whether the FC institutions are regulating and managing their forests in compliance with the LAS/WTS rules and regulations. The team includes not just FC staff but also third party observers. These observers originate from different types of NGOs, ranging from small, local organizations to internationally-oriented NGOs. All members of the audit team, including the second author, were involved in every step and moment of the audit, including field and site observations, and internal meetings and discussions of the audit team.

The audit is based on multiple data sources, methods and perspectives to verify if legality is being upheld by the FC institutions and in the logging and processing industries. The WTS allows the TVD to select an audit sample. After all, it is impossible, and also not its aim, to audit *all* operations. The TVD subsequently performs inspections on operations to complement the inspections done by local FC offices. Whereas in previous - paper-based - times, the auditing team had to go through many documents to sample operations for audit, the WTS database is now used as a basis for the TVD, for example to create a sample of operations that have a high priority, based on historical violations of the legal standard.

The audit process then starts at the forest floor. The TVD team searches for tree stumps within the compartment. The goal is to check if the tree stumps have been marked with their unique tag and with the correct paint. This is not only a check for compliance on the part of the logging operator, but also to assess if stock enumeration has been carried out correctly by the FC office. This means checking if the inscribed number is still visible after logging, and if the tree corresponds with the tagged stump. The painting of tree stumps alone is not sufficient to enable verification. The TVD uses the collected numbers of the tree stumps, to check compliance with the rest of the CCPs, e.g. timber rights

and pre-harvesting regulations.

After the logging operations have been audited, the TVD moves further down the timber value chain to the saw mills, where the timber is processed. As required by the VPA, all logs at the site should have a tag, and that is the first item that is checked. In addition, data on the number of logs are collected to compare with those in the WTS. Same as with the loggers, the processing operators need to provide documentation, in which they have to account for all logs present at the milling site. Following the visits to the logging and processing sites, the audit team returns to the FC district offices to check all the collected evidence with the documents and the WTS. If any inconsistencies are found, the TVD issues corrective action reports to the concerning FC staff. These corrective action reports are also shared with the regional managers and the FC headquarters.

The TVD audit not only functions as a verification of the CCPs along the timber value chain, but also verifies those elements of the legal standard that are not integrated within the WTS itself. For example, environmental standards are an important aspect of the auditing process. Checking for littering at the operation sites, for felling damages in the forests, and for waste management in mills and factories are all aspects of timber production that the TVD considers during the audit.

6.2. Compliance and non-compliance

Apart from verifying legality in the field, the TVD also recommends on implementation matters during the audit. For instance, when there were no tags visible on logs in the yard of a processing facility, the TVD advised the local FC department to place an embargo on all logs until they were able to reconcile the legality of those logs. Besides, the TVD can also recommend to confiscate logging equipment in case of illegal logging. During the field audit, one local man was unable to prove logging rights in a certain area, and his logging equipment was taken into custody by the local forest department.

Enforcement by local FC staff was also visible around local offices. In nearly every district office that the audit team visited, sometimes up to ten confiscated trucks with harvested timber were observed. It was explained that trucks with timber were often randomly stopped for documentation checks. If the truck driver was not able to show that his truckload was legally obtained, the entire truck with load would be confiscated and placed at the local FC office. Mostly, the driver is neither the owner of the truck nor of the timber, so the owner has to come to the FC office to claim his truck and the illegally acquired timber. After paying a hefty fine for the illegal activities, the owner can get his truck back, but not the timber load.

Generally, a high level of compliance was observed during the field audit. Especially large-scale operators appeared to have been successful in implementing the VPA. The audit team would often set out for an audit with an operator in the forest reserve, which meant a three to 4-h drive, across dirt roads, flooded roads, deep into the forest reserves. Even though these are hard to reach and located in remote areas, the logging operators visited were in high compliance with the legal standard. For example, in one site, a local guide was needed to guide the team through the forest to the tree stumps, and after ploughing through thick bush, the team found an overgrown stump and concluded that it was correctly tagged. Inspection of the process chain record made clear that this operator also complied with all other legality requirements. The high compliance demonstrates the regulatory capacities of the FC and the commitment of the logging operators. Our observations presented here are based on one audit, so it is not possible to generalize these findings to the entire FC and to other regions. However, the observed enforcement and high compliance are a promising indication for the future performance of the LAS/WTS.

There was one instance of non-compliance that was regularly observed during the audit. In the legal principles under criterion 5.2, it is stated that health and safety requirements are to be respected by employers and that this should be checked by the local FC office.

Nevertheless, at many of the visited milling sites, it was observed that employees were walking on flip-flops without protective equipment, e.g. nose-mask, helmets or glasses, when operating in highly hazardous conditions. People were seen operating large sawing rigs, where chips of wood were scattered around at high velocity and sawdust filled the air, wearing no protection at all. During the audit of these milling sites, the TVD team leader gathered the employer and all workers present for a stern educative lecture on the importance of using protective equipment, and that this situation is totally unacceptable. However, unlike the situations of absent marks on logs at milling sites, no embargo was placed on the operations for safety reasons, and it continued as before, even though a legal principle had been clearly violated. The auditors and the local FC department interpreted this as a non-compliance rather than a 'real' illegality, irrespective of the law (see Section 5.2 in the above).

6.3. Communities and legality

Another 'illegality' that was observed relates to small communities who live near or in forest reserves. For them, it is illegal to log without a felling permit, just as it is for large operators. Yet, the situation is very different for communities: the scale of felling is generally much smaller, they are dependent on these forest resources to maintain their livelihoods, and they have had this lifestyle for long. With law enforcement increasing due to VPA implementation, so-called 'forest illegalities' within communities are increasingly emerging as well. To address the problems that this causes for local communities, the VPA has further strengthened the implementation of the SRAs and has included them as an integral part of the legal standard under criterion 3.6. The SRA works as follows: companies who commence logging activities in a certain forest reserve, need to engage with the communities that live in or near this forest. Together with the FC office of that district, they set up the SRA in which agreements are made on how the communities are compensated for the logging activities.

However, the SRA's are not always easy to implement in practice and also questioned by critics. Remote communities are not always aware of their forest rights and it is not always clear which communities actually have forest rights. One criterion that is used to determine this is how close a community is located to forest reserves. However, how close is 'close enough' is not well defined. Also, chiefs tend to benefit more from these arrangements than other community members. Finally, Hansen et al. (2018) question if SRAs are in fact able to solve local 'illegality' problems. The benefits that SRAs deliver for communities are often outweighed by the actual market value of timber resources and they do not directly address the root causes of 'illegal' practices, such as the Ghanaian forest governance regime that disadvantages local communities and the poverty of most forest-dependent people in Ghana.

6.4. Data omissions and ambiguities

The WTS suffers from data omissions, for example about the mills. It is particularly challenging to collect complete data about mobile, small-scale sawmills since these move between locations, and they can remain inactive for longer periods. There are also challenges to correctly interpret the information that the WTS system provides. The WTS performs data synchronization and any discrepancy among those induces a red flag, upon which action must be taken. However, these red flags regularly occur, but do not necessarily mean that an illegality has occurred. For example, the people in the field use a handheld computer to add data to the WTS database. They do so offline, but once they go online, the information is synchronized with the database. Since this database is inaccessible to them, they are unable to correct small errors themselves, and for each error, a red flag will emerge. So, each red flag needs to be checked thoroughly by technical office staff to consider whether a 'true' non-compliance has occurred, or whether another reason is at play here.

6.5. Resistance

The introduction of a new practice and technology always comes with resistance. This occurred from within and from outside the FC. Resistance could be found within the FC itself, mainly because of a fear of change. After all, old ways of doing things had to be abandoned and new capacities and competencies had to be gained (see Section 5.3). Industry actors who have a strong stake in the status-quo were also not eager to see the system change. For example, most industry actors felt that the LAS, including the WTS, was unnecessary and too costly for the forestry sector of Ghana. They had to be convinced and informed about the increasing importance of certified timber in the contemporary international timber business. While many companies seem convinced of this, others are seeking routes to circumvent the legal requirements (Acheampong and Maryudi, 2020).

Violence against FC staff is a third type of resistance. The recent intensification of the implementation of the LAS and the WTS and the improved tracking and tracing of illegal activities have deepened frictions between local FC offices and local people, resulting in violent incidents in some cases. During the field audit, the TVD team was also advised to stay in the hotel after dark in a few cases, for their safety could not be guaranteed everywhere. To deal with this problem, the FC exercises a dual approach, combining strong enforcement with active education and engagement. To deal with violent situations, FC offices now have armed guards around the offices to patrol the area or join FC staff in the field. It is widely recognized though, that this is not a real solution and that it is important to actively engage with local people.

7. Discussion

As our analysis has shown, the Ghanaian LAS has adopted a *regulatory* governance mode, to inform regulators – both in Ghana and Europe – about the practices of timber value chain actors, whether these are indeed legal or not (see Fig. 1 in the above). It complements this regulatory mode with elements of a *communication* mode since third parties, including NGOs, have participated in the design of the LAS right from the start of the VPA process. The engagement of these NGOs deepened over time as they gained ever more access to the information and data in the WTS and strengthened their role in monitoring, verification and audits in the field. Although the system does not directly address consumers, like in an ideal communication governance mode, they are indirectly represented through NGOs in Ghana and Europe.

The WTS was initially designed as a fully digitalized *track and trace* model that would be able to relate each lumber and log to its source through GPS and barcodes. In response to challenges to identify individual logs in mixed bundles of timber, the WTS started to include elements of a *mass-balance* model as volumes of input and output are now also monitored at mills. Moreover, the system is less digitalized as once planned: a GPS-based system was not feasible so stems and logs do still have physical tags instead of digital barcodes. In addition, the WTS still has a paper-based fall-back option, in case of internet and power failures.

The system as it is currently in use is thus a hybrid one that mixes digitalized and paper-based elements, regulatory and communication governance modes and track-and-trace and mass-balance models. These adaptations can be understood when we consider the specific context of Ghanaian forest governance and management and the challenges that this poses in relation to technical requirements, data collection, ambiguities and competing interpretations.

As we have shown, most respondents are content with this traceability system, although more critical voices can also be heard. Moreover, stakeholders act upon the system in various ways, from active engagement to (violent) resistance. Ideal-typical traceability systems that are designed at the studio table will inevitably be put to the test in practice, and it is at the nexus among formal rules, technical designs, people's interpretations, and local actions that traceability systems start

to work and produce effects. It is therefore crucial that traceability studies go beyond the study of governance modes, organizational models and technical infrastructures and include 'trivial' daily practices of implementers, be it officials, organized stakeholders or ordinary people. This is not a new insight in studies of policy implementation – one might think of the literatures on 'street-level bureaucracy' (Lipsky, 2010), 'institutional bricolage' (Cleverly, 2012) and 'the meaning of implementation' (Yanow, 1996) – but they are thus far rarely included in traceability studies.

Our analysis in part confirms other studies on FLEGT and VPA implementation. For example, Nathan et al. (2014) take a practice-oriented perspective to analyse *prospects* for support and institutionalization (based on findings from a special issue on FLEGT/VPA, with data mainly derived from Ghana and Indonesia). They identify similar practical challenges for the effective implementation of the LAS/WTS. But whereas our respondents are overall quite positive about the LAS/WTS, Nathan et al. (2014) note mixed support from various groups of stakeholders. They find that national governments, large industries and NGOs are generally quite positive, while local communities, small enterprises and civil society organizations are much more critical (Nathan et al., 2014). As we also noted in our analysis, reasons for these local criticisms include a fear that the legalization of timber for international trade may constrain, exclude, or even criminalize local actors (compare Lesniewska and McDermott, 2014; McDermott et al., 2020; Maryudi et al., 2020; Setyowati and McDermott, 2017). As such, legality systems might reproduce existing and unequal power structures in the forest sector rather than bringing legal and environmental justice and good forest governance (compare Hansen et al., 2015; Maryudi and Myers, 2018). The fact that our respondents are more positive about FLEGT/VPA implementation may very well be related to our sample in which governmental actors were overrepresented (see Section 3).

Derous (2019) has also observed resistance against VPA implementation, in this case in Malaysia. As we also found in our study, the roots of this resistance can be found in existing inequalities between large operations and small communities in the forest sector (Derous, 2019). Hansen et al. (2018) observe more dialogue and transparency in the Ghanaian forest sector as a consequence of FLEGT/VPA, but also conclude that the LAS/WTS is mainly a technical fix that ignores and even reproduces deeper legal and political-economic inequalities (compare Myers et al., 2020). These findings all suggest that the FLEGT initiative seems to be unable to establish new, more just, forest governance regimes. As Rutt et al. (2018) point out, the question is whether FLEGT/VPA is not just another 'forest governance fad' that mobilizes enthusiasm at first, followed by disagreements, fatigue, and the continuation of business-as-usual. In response to this, we argue that our results provide reasons to be cautiously optimistic. The LAS/WTS system is far from perfect, but it is starting to perform, and as our respondents indicate and our analysis of the field audit demonstrates, there are signs that it is making a positive difference in practice.

8. Conclusion

To conclude, the Ghanaian LAS/WTS has moved from a 'digitalized regulatory track-and-trace system' on the design table towards a more hybrid one in practice, integrating elements of a communicative governance mode and of a mass-balance model, and keeping alive a parallel paper-based infrastructure. Although, the WTS is not yet in full operation since no FLEGT-licensed timber from Ghana has arrived at the European market yet (early 2021). So far, stakeholders – and government officials in particular – seem content with the new system but believe that further improvements are desirable. To be effective, these improvements must consider practical realities and challenges. One key conclusion of our study is that 'legality-on-paper' is not necessarily the same as 'legality-in-practice'. As the Ghana case shows, the strict distinction between legal and illegal that exists on paper did not uphold in practice and the ambiguity of the term 'legal' allowed for the

emergence of a third category of 'non-compliances'. This category was needed to accommodate day to day challenges and address local resistance. It also served, at least in part, to create a more fair playing field for small disadvantaged communities.

While the idea of traceability may be attractive for many, its implications for stakeholders will surface only in its practical implementation. The value of our practice-based approach lies in its ability to foreground these practices; and specifically the interrelations between formal designs and regulations, interpretations and concrete actions that constitute what we understand as implementation. While this does not negate the importance of pro-actively designing governance modes, organizational models and technical infrastructures, it does point to importance of including an assessment of whether they will actually be feasible and fit for purpose. The dangers of sterile design-based approaches is that they lose sight of the complex social-ecological realities – including the distribution of benefits and burdens among stakeholders – in which they will be embedded, negotiated and shaped. The further improvement and implementation of the LAS/WTS system in Ghana must build on the multiple social practices of forest use, management and conservation in place to ensure that efforts to improve governance and legality are not only effective but also equitable.

Declaration of Competing Interest

The authors experience no conflict of interest with regard to this paper.

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