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The International Forestry Review



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Special Issue: The Social Impacts Of Logging

EDITORS: T. MINTER, T. SUNDERLAND, D. NAITO and A.J. POTTINGER

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Cover photo: People crossing log pond created by logging company Burwood, West Are’are, Malaita, Solomon Islands, December 2019. (*Credit: Tessa Minter*)

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A.A. NAWIR and L. SANTOSO

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Paper or chapter in proceedings

SMITH, W.J. 2001. Selection of tree species for arid environments. In: BLACKBURN, J.W. (ed.) *Multipurpose trees and shrubs for fuelwood and agroforestry*. CNRD Monograph No4. 366 pp.

Book

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A call for a wider perspective on sustainable forestry: Introduction to the *Special Issue* on The Social Impacts of Logging

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HIGHLIGHTS

- The social impacts of logging in tropical forests are overwhelmingly negative and affect local and Indigenous people's livelihoods, their relationships with the forest and with each other.
- These impacts need to feature much more prominently in sustainable forest management policy, practice and assessment.
- This requires awareness of the broad and long-term nature of social impacts, which reach far beyond labour relations and the workplace, and far into the future.
- The gender inequities embedded in and reinforced by the logging sector require specific attention.
- Future empirical research must focus on the equitability of the design, workings and outcomes of social impact assessments, FPIC procedures, social auditing, benefit sharing and grievance mechanisms, particularly in certified logging operations.

SUMMARY

Global demand for timber is projected to grow and much of this timber will continue to be sourced from natural forests. As these forests, particularly in the tropics, tend to be inhabited by the world's most marginalized communities, the social impacts of logging require more attention within policy, practice and research. This Introduction to the Special Issue of *International Forestry Review* on *The Social Impacts of Logging* compiles evidence that the overwhelmingly negative social impacts of logging are systemic. As logging companies fail to fulfill their social obligations, and elite capture is common, the extent to which local communities benefit from logging operations is minimal, while long-term, harmful effects on livelihoods, social fabric and safety are severe. Logging operations reinforce and often exacerbate pre-existing inequities, particularly for women and Indigenous people. Weak governance, a lack of transparency and poor participation procedures partially explain this unfavourable situation. However, logging will only achieve better social outcomes if underlying power-imbalances are tackled.

Keywords: Sustainable forest management, benefit-sharing, equity, gender, social auditing

Un appel pour une perspective plus large sur la foresterie durable: Introduction au numéro spécial sur les impacts sociaux de l'exploitation du bois

T. MINTER, D. NAITO et T. SUNDERLAND

Il est projeté que la demande globale pour le bois d'ouvrage continue de croître, et le gros du bois va continuer à être obtenu dans les forêts naturelles. Comme ces forêts ont tendance à être habitées par certaines des communautés les plus marginalisées au monde, dans les tropiques en particulier, les impacts sociaux de l'exploitation du bois requièrent une attention plus grande, du point de vue des politiques, des pratiques et de la recherche. Cette Introduction au numéro spécial de l'*International Forestry Review* sur les impacts sociaux de l'exploitation du bois, rassemble les preuves que les impacts largement négatifs des opérations d'exploitation du bois sont systémiques. Alors que les compagnies d'exploitation du bois ne remplissent pas leurs obligations sociales, et que l'obtention par les élites est répandue, l'envergure des bénéfices récoltés par les communautés lors de l'exploitation du bois sont minimaux, alors que les effets négatifs à long-terme sur les revenus, la fabrique sociale et la sécurité sont sévères. Les exploitations du bois renforcent, et exacerbent même souvent les inégalités préexistantes, en particulier pour les femmes et les populations indigènes. Une gestion faible, le manque de transparence et des procédures de participation faibles expliquent en partie cette situation défavorable. Toutefois, l'exploitation du bois ne parviendra à de meilleurs résultats sociaux que si les inégalités sous-jacentes sont traitées.

Un llamado para una perspectiva más amplia de la silvicultura sostenible: Introducción al Número Especial sobre las Repercusiones Sociales de las Explotaciones Forestales

T. MINTER, D. NAITO y T. SUNDERLAND

Se prevé que la demanda mundial de madera aumente y que gran parte de esta madera siga procediendo de bosques naturales. Dado que estos bosques, sobre todo en los trópicos, suelen estar habitados por las comunidades más marginadas del mundo, las repercusiones sociales de las explotaciones forestales requieren más atención en la política, la práctica y la investigación. Esta Introducción al Número Especial de *International Forestry Review* sobre las *Repercusiones Sociales de las Explotaciones Forestales* recopila pruebas de que los impactos sociales de las explotaciones forestales, que son abrumadoramente negativos, son sistémicos. Debido a que las empresas madereras no cumplen con sus obligaciones sociales y la captura por la élite es lo habitual, el grado en que las comunidades locales se benefician de las operaciones madereras es mínimo, mientras que los efectos perjudiciales a largo plazo sobre los medios de vida, el tejido social y la seguridad son graves. Las operaciones de las explotaciones forestales refuerzan y, a menudo, exacerban la inequidad preexistente, especialmente para las mujeres y los Pueblos Indígenas. Las carencias en la gobernanza, la falta de transparencia y los deficientes procedimientos de participación explican en parte esta situación desfavorable. Sin embargo, las explotaciones forestales sólo lograrán mejores resultados sociales si se abordan los desequilibrios de poder subyacentes.

INTRODUCTION

As several major global crises coincide, the urgency for sustainable forest management is greater than ever. Both the climate- and biodiversity crises are getting increasingly close to a point of no-return (Armstrong McKay *et al.* 2022, IPBES 2022). Moreover, three years into the Covid-19 pandemic, it is clear that deforestation in the tropics has accelerated mainly as the result of relaxation of legal enforcement, and policy and market regulations (Brancalion *et al.* 2020, UCL 2021). The Russian invasion into Ukraine in February 2022 is likely adding further pressure on tropical forests, as it has resulted in a ban on timber imports from Russia by major timber importing countries (ITTO 2022, WWF 2022).

Sustainable forest management (SFM) is generally understood as the use of forests in a manner that ensures their long-term productivity and ecological integrity, thereby reconciling economic, environmental and social objectives (FAO 2016). Thus, the social aspects of forest management are integral to SFM. However, in the specific context of logging operations, they receive much less public and policy attention than the environmental aspects. Moreover, the social impacts of logging remain under-researched and poorly addressed (Cerutti *et al.* 2014, 2017).

This is despite the fact that most tropical timber continues to be sourced from natural forests that are inhabited, used or otherwise valued by people. About 20 per cent of the world's tropical forests (3.9 million km²) are currently subject to selective logging (IPBES 2022: 19). Although the number of people living around these logging operations is unknown, the extent to which these people are reliant on forests is high, and encompasses multiple dependencies, ranging from material to spiritual (Chao 2012, Fedele *et al.* 2021, IPBES 2022, Newton *et al.* 2016, 2020).

The close relationship between people's wellbeing and forests is by now well-established and receives considerable scholarly and policy attention. Key areas of interest within this highly interdisciplinary field are the importance of forests for livelihoods (Nerfa *et al.* 2020, Wunder *et al.* 2014), food

and nutrition security (Angelsen *et al.* 2014, Arnold *et al.* 2011, FAO 2017, Ickowitz *et al.* 2014, Tata-Ngome *et al.* 2017), health (Colfer 2008, Karjalainen *et al.* 2009), spiritual well-being and cultural integrity (Verschuuren and Brown 2019, Wyatt *et al.* 2021). Increasingly, gender is acknowledged as a crosscutting aspect of the role that forests play in human well-being (Colfer *et al.* 2018, Mai *et al.* 2011, Mwangi and Mai 2011, Sunderland *et al.* 2014).

What is lacking, however, is specific and comparative scientific scholarship and policy attention for these intersecting aspects of human well-being in relation to logging operations. Here, we define these as the commercial and industrial extraction of timber by specialized felling companies, which may be either locally, nationally or internationally owned. Logging operations may last from only a couple of months to several decades, depending on their size, the type of forest and arrangements with formal owners of the forest land on which they take place. Very often this is the State, but forest land may also be the collective property of customary owners, or individually owned.

Global demand for tropical timber continues to be high and is projected to grow further (IPBES 2022). This demand is driven by population growth, increasing wealth levels especially among middle classes in the developing world, and an increased interest in wood as low-emission construction material (Goubran *et al.* 2020, Nambiar 2019, 2021, Ramage *et al.* 2017). Globally, wild tree species currently provide two thirds of industrial roundwood (IPBES 2022: 12). Although industrial and small-holder plantation forests play a growing role (Kambugu *et al.* this volume, McEwan *et al.* 2020, Nambiar 2021), the projected increase in timber demand will not be matched by plantation wood (IPBES 2022: 21).

Natural forests therefore remain important for large-scale timber extraction in the foreseeable future, despite the reported negative long-term environmental impacts (Petrokovsky *et al.* 2015). An estimated 12 per cent of wild tree species are presently threatened by unsustainable logging (IPBES 2022: 16) and tropical forests in the Philippines, East-Malaysia, Indonesia and Thailand have been heavily affected, and in

some cases depleted, by earlier logging boom and bust cycles (Contreras 2003, Gillis 1988, Kummer 1992, Ross 2001).

The logging frontier thus continues to shift to increasingly remote regions and locations. These include notorious ‘deforestation fronts’ such as the Peruvian and Brazilian Amazon, Central Africa, Sumatra and Borneo (WWF 2021), but increasingly also less well-known frontiers such as Papua New Guinea (Mousseau and Lau 2015) and Solomon Islands (Global Witness 2018, Minter and van der Ploeg, this volume).

Why Social Impacts?

Given the continuation of industrial logging in human-inhabited forests across the tropics, improving our understanding of its social impacts is critical. However, the empirical literature on the social impacts of logging remains scant and fragmented, even though the available scholarship on the subject has since long pointed to its importance (Counsell *et al.* 2007, Davis 1977, Laurance *et al.* 2012, Nambiar 2019, Roberts 2019, Sponsel *et al.* 1996, Watson 1996, Wilkie 1996), as have outcries by NGOs and investigative journalists regarding logging-related injustices.¹

Timber certification schemes represent current best practices for socially responsible forestry, but 87% of certified forests are located in temperate and boreal regions, while only a small share of logging operations in the tropics presently fall under such schemes (Xu and Lu 2021: 108). Moreover, there still is little evidence available to assess the results of these efforts (Burivalova *et al.* 2017, Cerutti *et al.* 2017, Defo *et al.* 2013, Ehrenberg-Azcárate and Peña-Claros 2020, IPBES 2022, Naito and Ishikawa 2020), and very few empirical studies focus on the social outcomes of certified logging (e.g. Frey *et al.* 2022, Kalonga and Kulindwa 2017, Leite *et al.* 2017, Tsanga *et al.* 2014).

Doing justice to the wide range and reach of social impacts requires keeping an equally wide perspective on what they might entail. We therefore follow VanClay (2003) and VanClay *et al.* (2015) and define social impacts very broadly, namely as any issues associated with a planned intervention (in our case logging operations) that affect or concern people. Social impacts may be experienced at the level of individuals, households, larger social groups, in the workplace, community or society at large. They may be cognitively or physically experienced; they may be positive or negative; and they may be direct, indirect, or even unintended.

The often intangible, yet dominant presence of social impacts even well before anything is physically happening is well-captured by VanClay (2020: 127): ‘*Unlike biophysical impacts which arguably happen only when construction starts, social impacts happen the moment there are rumours about a potential project. Anxiety is created, and speculation and opportunism occur, creating social impacts. These impacts happen whether or not the project proceeds. People’s*

fears, even if ill-founded, also create social impacts. [...] This gives rise to the adage that perception is reality, and that perceived impacts are real social impacts.’

Knowing and documenting what happens on the forest floor before, during and after logging operations is especially pertinent because they often take place in socio-economically precarious contexts. First, tropical forests represent some of the world’s poorest areas (Counsell *et al.* 2007, Jagger *et al.* 2022, McDermott and Schreckenber 2009). Fungo *et al.* (this volume) show, for instance, that levels of food insecurity in and around logging concessions in four Central African countries are extremely high. While logging operations are generally promoted as a way to not only boost national income, but also alleviate poverty at the local scale, the question of whether this actually happens is a critical one (Defo, this volume).

Second, and relatedly, many logging concessions are inhabited by populations that belong to the respective countries’ most politically and socially marginalized groups, and often include Indigenous communities (Chao 2012, Chomitz *et al.* 2007, and see Mei, this volume). These communities tend to be poorly informed on the social obligations that logging companies and forestry authorities owe them (Young and Nkuintchua, this volume) and they are ill-equipped to effectively negotiate for fair benefits.

Third, the logging industry is highly masculine, which raises multiple issues with respect to gender relations and gender equity, both in relation to logging employment, health, safety and the wider gendered impacts of logging operations on local communities, including prostitution, alcohol and other substance abuse (Macdonald 2018, Minter 2021a, b).

Fourth, tropical logging frontiers generally represent areas with weak government presence in general and poor justice delivery in particular. This creates situations of *de facto* lawlessness, where logging operations often take place practically without oversight (Allen *et al.* 2013, Bennett 2002, World Bank 2017). This also means that our understanding of how the burdens and benefits of industrial logging are locally distributed is particularly limited.

Fifth, logging frontiers represent meeting points of very different economic systems, cultures and worldviews, and logging operations accelerate socio-economic and environmental change (Moran 1988, Persoon and Cleuren 2002), for which local communities are generally unprepared. The pace and scope of this change often result in social and cultural fragmentation, conflict and heightened local inequality (Defo, this volume, Minter and van der Ploeg, this volume).

Approach

The idea for compiling this *Special Issue* of the *International Forestry Review* arose during the 2018 FLARE² Annual Meeting in Copenhagen, after which the three co-editors each set

¹ Examples of these include NGOs like [Amnesty International](#), [Forest Peoples Programme](#) and [SAVE Rivers](#); and news reports by [Mongabay](#), [BBC](#), and [The Guardian](#).

² Forests, Livelihoods, Assessment, Research, and Engagement.

out to use their own research and networks to contribute and solicit papers. This turned out to be a challenge. While many researchers in forestry have come across the social impacts of logging as part of their work, and can relate to their importance, they are rarely the object of specific study. This underscores both the lack of and thus the need for empirical work on the subject.

The result is a modest, but rich and interdisciplinary collection of papers, which despite their diversity, shed light on the multiple social impacts of logging. The eight contributions³ cover cases from Africa (Ghana, Liberia, Cameroon, DR Congo, Republic of Congo, Gabon and Uganda), South America (Brazil), Southeast Asia (Indonesia) and the Pacific (Solomon Islands). All focus on logging in natural forests, thus excluding the commercial felling of plantation forests. This is because we are especially interested in the impacts of logging operations on people whose livelihoods and well-being directly or indirectly depend on natural forests.

Two papers take a legal and policy approach, comparing frameworks globally (Mei) or regionally (Young and Nkuintchua). One paper takes a nutritional perspective, comparing food frequency data from six logging concessions in three Central African countries (Fungo *et al.*). A further two papers specifically look at the position of smallholders in the logging sector (Cromberg *et al.*, Kambugu *et al.*), while three other papers are in-depth case studies of the broad social impacts on people living in and around industrial logging concessions in one particular country (Defo, Minter and van der Ploeg, Persoon and Wardani). The latter brings a long-term ethnographic perspective to the discussion on social impacts of logging, spanning several decades.

A number of methodological challenges are inherent to studying social impacts. First, as Persoon and Wardani (this volume) point out, many social impacts of logging occur as the long-term result of the accumulation of earlier impacts. For instance, the construction of logging roads facilitates not only timber felling, but also the influx of poor, landless farmers who settle along these roads and convert logged forests into farmland. Over time, these new agricultural enclaves expand further into the remaining forests, where they compete over increasingly scarce land and resources with forest-dwelling communities already living there (Kummer 1992, Kummer and Turner 1994, Minter 2010, Rai 1981, van den Top 2003, Wardani 2022).

Second, and related to the cumulative nature of social impacts, is the issue of attribution (Clark *et al.* 2004). What, in the chain of events set in motion by a single logging operation, can with certainty be attributed to this logging operation? There usually is no possibility for a counterfactual analysis, a comparison of what has actually happened with what would have happened without the intervention (White 2006: 3). Moreover, reliable baseline data on the demography

and socio-economic conditions of people living around logging operations are rare. Even if they are available, no agreed scientific approach to attribution and causality exists in impact measurement (Romero *et al.* 2017).

However, as several papers in this *Special Issue* demonstrate, qualitative methodologies, combined with long-term presence in the field and on-site observations methods can help addressing the problem of attribution. In-depth interviews bring to light intimate local knowledge and insights of how and why change unfolds. The technique of probing (asking follow-up questions) allows people to articulate their own observations on and interpretations on the sequence of events, and how these do or do not mutually influence each other.

WHAT ARE THE SOCIAL IMPACTS OF LOGGING?

Below, we discuss three broad groups of social impacts of logging on local communities as they arise from this *Special Issue*. These are impacts on: 1) Local monetary economies and development, which includes a discussion of the extent to which local communities gain from logging in terms of money, jobs, in-kind contributions and wider economic spin-offs; 2) People-forest relations, including both subsistence and cultural-spiritual dependencies on forests; and 3) Social relations, and specifically inequalities and conflict.

Local monetary economies and development

The logging sector is commonly presented as a major contributor to national and local economies and development through revenues, job generation and the provision of road infrastructure and other basic services (Counsell 2007, Defo, this volume, Laurance *et al.* 2012). However, especially in relation to the sector's economic contributions at the local level, such claims are rarely accompanied by solid evidence. Various papers in this *Special Issue* highlight the discrepancy between the promise of such *potentially or perceived* positive social impacts and the extent to which these actually materialize for local communities living with logging operations.

Money and jobs

The question of the extent to which logging revenues reach local communities is addressed in several papers. Young and Nkuintchua demonstrate that in four central African countries, logging companies are legally required to provide local communities with area- and volume-based payments, as well as monetary compensation for damage to local properties, usually agricultural crops. However, these payments, which tend to be initially collected by the State and then redistributed to local communities through local or traditional authorities, are prone to elite capture, resulting in millions of dollars not ending up with the rightful recipients.

³ This Special Issue was developed over three years. As such, some papers were completed in 2021 and 2022 and subsequently made available by the *International Forestry Review* prior to the publication of the complete Special Issue in 2023. Citations of these papers may appear in some publication as being published in either 2021 or 2022. However, while the content of those papers has not changed, the final version, including page numbers, should hereinafter be cited from this volume.

The paper by Defo details how this works in his case study of Ngoyla (Cameroon). He demonstrates how over a six-year period, the allocation of the Annual Forest Royalties (AFR), which constitutes 80% of Ngoyla's council budget, has failed to make a positive contribution to local development because community interests have been side-lined over those of local elites. Minter and van der Ploeg document similar outcomes for Solomon Islands, where local communities are legally entitled to receive logging royalties worth up to 15% of log export values. In practice, however, the exact amounts paid remain obscure, and are exclusively received and kept by a select male elite. Persoon and Wardani, too, describe how among the Indigenous Orang Rimba, in Jambi Province (Sumatra, Indonesia) throughout the decades-long history of logging, only a few men received incidental payments from the logging companies. For the nearby Mentawai Islands, Eindhoven (2019) has documented how logging operations have equally mainly benefited new local political elites.

Job creation is another main avenue through which logging operations potentially benefit local economies and individual households, but the extent to which this is the case is variable. Defo shows that in Ngoyla, 246 jobs were created, which made the logging sector the largest employer of the non-State formal sector of this subdivision, especially for young people. However, of these jobs, only 41% were taken by people from neighbouring villages and still fewer of these jobs benefited the Indigenous Baka. Although they form 18% of the local population, only 6% of the logging jobs were held by Baka and almost all of these were temporary. Similarly, Persoon and Wardani, note that the Indigenous Orang Rimba were never structurally employed in the logging operations in Jambi. Instead, they were incidentally hired as tree pointers, forest guides or protectors of logging equipment, while Malay people, as well as Javanese and Balinese transmigrants were hired for the more structural and better paid jobs. In Solomon Islands, Minter and van der Ploeg note a sharp division between imported forestry professionals (mostly Malaysians, Filipinos and Indonesians) who perform the permanent, higher paid jobs in logging operation management and machine operation; and poorly paid, highly temporary jobs that are fulfilled by local men, and a handful of women.

The type of logging is of significant influence on the extent to which it generates jobs. Solomon Islands, for example, predominantly exports round logs, which requires relatively little in-country processing, and thus limited labour. This is exacerbated by the above-mentioned employment of expatriate labour by logging companies. At the other end of the spectrum, the papers reporting on the sector in Brazil (by Cromberg *et al.*) and Uganda (Kambugu *et al.*) focus on the informal timber sector, which is highly labour intensive throughout the value chain. In Uganda, actors involved in the upstream activities, are significantly dependent on the business for their livelihoods. Remarkably, however, even there, most labourers reportedly do not originate from the areas where the timber is harvested. As a result, except for money spent locally by incoming timber harvesters, the local population receives few monetary benefits from the informal timber sector.

In-kind contributions

Logging operations are also generally promoted as a means to generate local development through the provision of infrastructure (roads, ports, water systems) and basic services such as schools and clinics. Depending on the national context, logging companies may either be legally obliged to provide such in-kind contributions, or they are part of the 'license to operate' (Young and Nkuintchua, this volume, see also VanClay 2020, Wilkie 1996). Ultimately, they have to be negotiated for by local communities.

The most positive and tangible in-kind contribution to local people's lives documented in this *Special Issue* is the construction and maintenance by two logging companies of a ferry crossing the Dja River in Cameroon, reported by Defo. Otherwise, the delivery of in-kind contributions is highly disappointing and biased towards projects with high visibility but low relevance to local well-being (see also Tsanga *et al.* 2014).

Importantly, transparency is often lacking. In the four countries included in Young and Nkuintchua's review (Cameroon, Ghana, Liberia and Republic of Congo), there is no system in place to monitor the fulfilment of these obligatory contributions. This starts with the fact that the agreements in which they should be specified are not systematically attached to logging contracts, and are not publicly available. Likewise, in 14 logging concessions in Solomon Islands, logging companies promised to fulfil local communities' development aspirations, but these promises were rarely formalized and consequentially generally never or very poorly delivered (Minter and van der Ploeg, this volume, see also Laurance *et al.* 2012, VanClay 2020).

Shadow effect

Slee (2006) has argued that we can only assess the full economic impact of logging if we take into account the 'shadow-effect': the *indirect* impact of forestry on surrounding economic activity. A number of papers in this *Special Issue* indeed address the wider spin-offs of logging operations on local economies.

For Ngoyla (Cameroon), Defo reports an overall increase in economic activity and an improved standard of living for the people who benefited from the jobs that were created (see also Wilkie 1996). However, for the majority of local residents, poverty increased due to rising prices and deleterious environmental impacts on subsistence-based livelihoods. Moreover, education, health and drinking water facilities did not improve, and in some cases worsened. For instance, as a result of logging related immigration, pressure on school infrastructure and staff increased and classrooms became more crowded.

For Solomon Islands, Minter and van der Ploeg note that the most significant indirect economic impact is the small-scale logging and timber milling that arises in parallel to industrial logging operations. Local residents use the company infrastructure to access remote forest areas, and transport and sell timber, which generates substantial cash income, or is used for local construction. Another spin-off effect is the increase in marketing activity on log-ponds, where local

residents sell farm products and fish to incoming logging labourers and fellow local residents. However, as logging operations are always temporary, such benefits are short-lived (see also Wilkie 1996). Moreover, local shop keepers also face competition from the company-owned stores, who sell imported goods which they transport on in-coming logging ships.

Persoon and Wardani explicitly take indirect impacts into account, as they sketch the long-term, cumulative nature of the changes unfolding for the Orang Rimba as their hunting and gathering grounds were in various historical periods first opened up by roads, then logged, and eventually converted into industrial plantation areas. The smallholder rubber stands that some Orang Rimba groups have over time developed might indeed be seen as an economic spin-off of this process, but so can the impoverishment and famine that cost the lives of 15 Orang Rimba in 2015, whose forest was converted into a palm oil plantation (Wardani 2022).

Thus, while it is indeed important to take the shadow-effect into account in order to assess the full economic impact of logging operations on local communities, this *Special Issue* shows that in as far as positive contributions are concerned, this 'shadow' tends to be limited. Moreover, as will become clear below, it is a rather dark shadow too, particularly for those communities who depend heavily on forests both economically and culturally.

People-forest relationships: subsistence and spiritual values

While the monetary and in-kind contributions to local communities are one way of assessing the social impacts of logging, it is vital to also take into account how logging operations affect the multiple aspects of people-forest dependencies and relationships.

Subsistence

Fungo and colleagues, for instance, demonstrate the importance of wild forest foods for people living around logging concessions in Cameroon, DR Congo and Gabon. Based on data sets on food frequency, dietary diversity and forest food consumption collected among 720 female household heads from these three countries, they show that wild forest foods were key components of diets for the large majority of households, and especially so in DR Congo. At the same time, food insecurity was extremely high across the board, and again highest in DR Congo, where 100% of sampled households rate as 'severely food insecure'. Importantly, in both Cameroon and Gabon, food insecurity was significantly higher around concessions *without* a management plan, as compared to those *with* such a plan.

If logging operations are poorly managed, or ignore or even deny the presence of forest-dwelling peoples in and around concession areas, the consequences are detrimental. This has been the case, for instance, for Indigenous populations like the Baka in southern Cameroon as Defo reports, and the Orang Rimba in Sumatra, Indonesia (Persoon and Wardani, this volume, see also Wardani 2022). All of these groups subsist to a large extent on hunting, fishing, gathering

and small-scale agriculture, but in planning and implementing logging operations there has been little or no regard for basic livelihood needs. Even for FSC-certified forests in Cameroon, Cerutti *et al.* (2017) express concern that use restrictions pertaining to concession areas set aside for conservation purposes, may compromise local people's livelihoods.

In Solomon Islands, the exclusion of women from decision-making on logging operations results in the destruction of their most important subsistence base: mangrove forests. These fishing and shell-collection grounds are frequently clear-cut and converted into log-ponds. Also, upstream logging activities often causes run-off and in turn sedimentation of mangroves and shallow reefs. Over the years, this has contributed to a decrease in consumption of fish and shellfish, which is the most important source of animal protein. At the same time, the presence of company shops accelerates a shift in diets from home grown tubers to increased consumption of rice and instant noodles, and the replacement of fresh fish by canned fish (Minter and van der Ploeg, this volume).

In addition to food security, water security is an issue of importance in many logging concession areas. Fungo and colleagues (this volume) report a very high dependence on unprotected water sources around forest concessions: 75% in Cameroon and Gabon and 100% in DR Congo, where the presence of logging companies has failed to alleviate water insecurity. Defo (this volume) confirms this for Cameroon, where in fact he reports that during logging operations water facilities have in some cases worsened. The same is true in Solomon Islands, where the great majority of rural people rely on unprotected water sources, and where logging operations frequently damage or pollute these sources through oil spills and sedimentation. Given that collecting water is considered a female task, it is especially women who are burdened with finding alternative – and usually more remote – water sources (Minter and van der Ploeg, this volume).

But is not only the direct loss or damage to resources, or loss of access as a result of logging operations that is putting peoples' livelihoods and diets under pressure. Among the indirect results of logging often is an influx of poor, landless farmers who compete with Indigenous forest dwelling peoples over land as well as forest resources, including game and fish (Defo, this volume, Persoon and Wardani, this volume, Sponsel *et al.* 1996). The sharply increasing demand for wild game by these populations and by incoming company workers regularly results in overexploitation, even though in the short run local and Indigenous hunters may also earn from it (Wilkie 1996). For instance, a logging operation in the eastern Solomon Islands resulted in the decimation of one island's wild pig population, because foreign loggers brought hunting rifles (Minter *et al.* 2018). Similar local impacts on wildlife as a result of increased hunting pressure have been documented for the Philippines, where the Indigenous Batak and Agta saw their hunting and fishing success decline sharply as logging operations gained in intensity from the 1970s onwards, and frontier populations grew rapidly (Eder 1987, 1996, Headland 1986, Minter 2010, Persoon and van der Ploeg 2003). The impacts on forest-dwelling peoples' subsistence are particularly destructive where logging operations are accompanied

by government-encouraged transmigration and road building schemes, of which the Brazilian Amazon probably represents the most extreme example (Davis 1977, Moran 1996).

Spiritual relations

No matter how vitally important these material and everyday dependencies of people on forests, as Wyatt *et al.* (2021: 10) point out, “[...] *forest landscapes are much more than [...] a source of raw materials or wood fiber. Instead, it is the relationships between people and their forests that are critical, often expressed in ways and language that are unfamiliar to researchers or managers.*” The social, cultural and spiritual relations that people have with these forests are multiple, and they often include, but are not limited to, the forest as knowledge base; as a space to perform important cultural rites; and as the home of the ancestors and other spiritual beings with whom positive relations must be maintained (Flexner *et al.* 2019, Hagen *et al.* 2017, Minter 2010, Twinamatsiku *et al.* 2019). In their most tangible form, these relations are embodied in specific locations or resources, such as honey trees (for the Orang Rimba in Indonesia, Wardani 2022), ancestor worshipping sites, burial grounds, birthing caves or otherwise sacred forest areas. Despite attempts by forest dwelling peoples to have such sites excluded from logging operations, they are often trespassed nonetheless, which in turn tends to give rise to local unrest and resentment (see also Takeuchi *et al.* 2020, VanClay 2020).

Social relations

Of all the different social impacts of logging, those that concern local social relations are the least documented. This is not because they do not occur, but because they are the most difficult to capture in existing social impact assessment protocols and because the professionals conducting these assessments are rarely trained to identify and document them. However, logging operations tend to come with severe disruptive impacts on local communities, which often outlast the operations themselves. A main reason for this is that the commodification of land and other natural resources completely rearranges not only how people relate to these resources, but also how they relate to each other. Several papers provide further evidence of how logging operations reinforce or heighten social inequalities, and sometimes introduce new ones (Defo, Persoon and Wardani, Minter and van der Ploeg, this volume).

Competition over land

One way in which inequalities are heightened or introduced is through increased competition over land. Defo demonstrates how this leads to the further marginalization of already vulnerable Indigenous groups in Cameroon, where incoming logging employees suddenly come to compete with local communities over the lease of cocoa plantations. This especially affects the Indigenous and highly impoverished Baka who rent out their cocoa plantations at low prices, in order to then become workers themselves in these same plantations receiving payments consisting of alcohol, cigarettes, old clothes

or minor cash payments. Defo concludes that industrial logging has accentuated the practice of quasi-enslavement of the Baka by other ethnic groups. Similar links between logging-induced deforestation and the deculturation, impoverishment and subordination of hunter-gatherers into an underclass of landless peasants have been described for the Philippine Agta (Early and Headland 1998, Headland 1986) and Batak (Eder 1987).

Another type of competition over land arises in situations where land is the collective property of customary owners. In the case of Solomon Islands (Minter and van der Ploeg, this volume), previously relatively fluid notions of landownership have to become formalized and fixed as land and forests suddenly take on monetary value. However, as Tulus (2017) notes for the Mentawai Islands, collective land ownership is among the most complex institutions. Formalization of collective land ownership thus almost invariably leads to contestation.

For this reason, while the legal recognition of collective land rights to customary landowners is an important prerequisite for equitable forest management and benefit sharing (Mei, this volume), we would like to caution against the implicit assumption that collective land ownership is synonymous to collective benefit sharing. Even where collective land ownership is fully legally recognized, forestry can still have highly inequitable socio-economic outcomes (see also Roberts 2019 for Papua New Guinea). Very similar observations have been made for benefit sharing from mining royalties in situations of collective landownership (see Macintyre 2007, Minter *et al.* 2012, Laurance *et al.* 2012).

Elite capture

These new notions and values of land ownership in turn create new ‘haves’ and ‘have nots’, as those who successfully (though not necessarily legitimately) claim formal land ownership have access to both decision-making power as well as to the monetary benefits associated with logging operations. This often results in elite capture along lines of gender, ethnicity, age and political loyalty. As Young and Nkuintchua state (this volume) “*Their complexity renders social obligation systems open to abuse at many levels, and ‘local recipients’ rarely means communities themselves. Their intent might be to decentralise power but this often allows local elites – council members, government officials, traditional authorities – to stand in the way of the community members most affected by logging operations and capture most benefits.*”

In addition to being part of the broader trend of decentralization in forestry (Frey *et al.* 2022), the rechannelling of forestry benefits through sub-national and sometimes customary authorities also relates to efforts to move away from situations where logging companies function as a ‘State within a State’ (Singer 2008). This is at least the case in Central African countries, where companies were expected to directly support the development of local communities by providing both cash and in-kind benefits (Cerutti *et al.* 2017: 60). This model has been criticized for being undemocratic and for lacking transparency; for its focus on short-term visibility rather than

lasting development impact; and for compromising governments' sovereignty (Singer 2008: 175).

By instead demanding that logging companies pay fees to local government or customary institutions, the responsibility for poverty reduction and development of local communities comes to rest with those institutions. However, when, as a result of elite or State capture, such benefits are not forthcoming, "[...] people continue to turn to the companies for financial and in-kind support" (Cerutti et al. 2017: 60). Indeed, this is exactly what we see happening in several contexts described in the papers, often with highly disappointing outcomes.

Gender inequities

Another type of structural inequality that often predates, but is exacerbated by, logging operations are gender inequalities. As noted by IPBES (2022: 22): "*Gender is seldom taken into account in the governance of wild species, leading to inequities in the distribution of costs and benefits from their use.*" Such gender-blindness is highly problematic because in many settings women are denied formal land and resource ownership rights and consequently the rights to the monetary derivatives thereof (Kambugu et al., Minter and van der Ploeg, this volume). Importantly, the idea that logging money is male money often is not limited to the royalties that may be paid, but in many cases also to the money that may be earned through employment in logging, which creates intra-household income inequality (see also Burivalova et al. 2017, Roberts 2019).

Part of this has to do with the strongly gendered labour arrangements in the sector (see MacDonald 2018 on similar dynamics in the mining sector). Although at the urban-based offices of logging companies women may work as administrators, very few women are employed in the actual logging concessions. The sole jobs fulfilled by women are the low-paid care jobs of cooking and cleaning for the male workforce in logging camps. In the informal logging sector, too, the division of labour is strongly gendered. Kambugu et al. (this volume) describe that in Uganda, with the exception of a small number of young women who are involved in the harvesting process as timber carriers, female involvement is mostly in trading. Women traders prefer to procure and sell timber at the market (despite lower profits) in order to avoid risky and time-consuming activities associated with timber production. They also operate smaller wood stocks than men. Moreover, in these roles, they depend on men (usually their spouse) to deal with law enforcement agents.

Conflict and violence

Several papers show how these heightened inequalities produce situations of conflict and lack of safety, or may do so in the future, in at least three ways.

First, the generally deeply contested nature of the formalization of landownership, the inequity and lacking transparency surrounding decision-making and benefit-sharing, are sources of deep rifts within and between local communities.

Indeed, Defo notes that inter-ethnic and xenophobic conflict looms in Cameroonian logging operations, as tensions between incoming logging employees and local residents increase. Likewise, Kambugu et al. express concern that in Uganda, lack of local benefit capture could produce conflicts between local communities and timber harvesters. They call for careful consideration of this risk by local and national policy makers in order to reduce inequities and prevent conflicts along the value chain. In Solomon Islands, logging operations are without exception associated with local conflict, regularly resulting in outbursts of, sometimes lethal, violence within and between local communities, as well as between local communities and logging companies (Allan et al. 2013, Minter and van der Ploeg, this volume).

Second, the masculinity of the logging industry and the patriarchal nature of local socio-political arrangements together produce harmful and unsafe situations for local women and girls (Minter 2021a, b). Indeed, sexual violence in logging operations is widespread and systemic. For instance, during a visit of Indigenous environmental activists from Malaysia to the Netherlands in May 2022, a young Penan woman from Sarawak described to the first author how she and her friend (both minors at the time of the incident) hitchhiked on a logging truck from school to home, when one of them was groped by the truck driver, an employee of the logging company. For lack of public transport, the girls endured the sexual harassment and ran out once the truck stopped. This is not an isolated incident: earlier cases of rape by employees of the same logging company have been documented.⁴

As a result of both forced and voluntary sexual encounters between incoming loggers and local girls, teenage pregnancies and fatherless children are common in logging concessions (Defo, Minter and van der Ploeg, this volume). Moreover, as has since long been noted, through its heavy dependence on a highly mobile male workforce, the logging industry is associated with increased risk of the spread of Sexually Transmitted Diseases (Counsell et al. 2007, Defo, this volume, IOM 2019, World Bank 2017).

A third way in which logging operations contribute to unsafe situations is through an increase in alcohol and drug abuse that is reported in the papers by Defo and Minter and van der Ploeg (see also Alemagi and Nukpezah 2012). In both Cameroon and Solomon Islands logging wages are known to be predominantly spent on alcoholic beverages and drugs. These problems are also related to an increase in high school drop-out rates, and incidences of gender-based violence and theft.

Finally, the risk of these conflicts spilling over to supra-local levels is real, especially because local grievances often also relate to close entanglements between the logging sector and national political elites as well as State capture (Allen 2008, Young and Nkuintchua, this volume). In Solomon Islands this is attested by periods of violent civil unrest in the late 1990s and more recently in late 2021. In both cases, dissatisfaction over the distribution of logging revenues is known to be among the roots of the violence (Bennett 2002, Donald

⁴ See Bruno Manser Fonds | News, for how these accusations resulted in retaliation by the logging company.

2022, Ride 2021). Similar conflicts over the distribution of logging and mining benefits have also plagued Papua New Guinea (Laurance *et al.* 2012, Macintyre 2007). All of these examples should act as reminders of how easily natural resource conflict can escalate into episodes of national violence.

CONSIDERATIONS FOR FUTURE POLICY, PRACTICE AND RESEARCH

The evidence presented in this *Special Issue* demonstrates that the social impacts of logging for local communities are overwhelmingly negative, ranging from limited monetary contributions, to undermining subsistence economies and social relations, to human rights violations. In the following, we identify a number of key issues that require specific attention from policy makers, practitioners and researchers in the forestry sector, and in particular from the logging industry itself. An important insight to begin with, however, is that much of the social harm and lack of lasting benefits need not occur if existing legal and policy frameworks were adhered to. The two opening contributions to this *Special Issue* make this very clear.

First, Mei provides an overview of Indigenous peoples' rights as articulated by three United Nations human rights treaty bodies and two regional human rights courts. She points out that Indigenous rights in relation to natural resource exploitation, including logging, can be grouped into four interrelated categories, namely: well-being rights; cultural rights; land, territory, and resource rights; and self-determination rights. Mei highlights that prevention of any harmful infringements of these rights must begin prior to actual logging operations, and she calls on the logging sector to set aside time and resources to do so.

Next, the paper by Young and Nkuintchua continues the discussion on rights by analysing and comparing the legal frameworks specifying logging companies' social obligations towards local communities in Liberia, Ghana, Cameroon and Republic of Congo. The authors demonstrate that in all four countries, wealth redistribution from logging companies to local communities is not just a voluntary act of corporate social responsibility, but a legal requirement. However, despite the existence of legal frameworks that specify these obligations, they materialize very poorly. Where do things go wrong?

Free, Prior and Informed Consent and community representation

A thorough and meaningful Free, Prior and Informed Consent (FPIC) process is at the heart of socially sustainable logging operations. This legal obligation is stipulated in many national and international frameworks, as well as in certification guidelines. As Mei details in her paper, under this participatory process, any planned logging operation starts with conducting an assessment of the potential social, cultural, economic and other human rights impacts of the logging operation, and of its prevention and mitigation measures.

Next, the outcomes of this assessment need to be shared with the potentially affected communities as part of their decision-making process around the project. This then results in the community either providing or withholding their approval of the project. If the decision is positive, finally, consensus needs to be reached with the community regarding prevention and mitigation measures, damage compensation and benefit-sharing.

Much has been written on what FPIC is, why it is important and how it should be implemented (Colchester and MacKay 2004, Esteves *et al.* 2012). However, the growing body of empirical literature on the implementation of FPIC and the accompanying need for community representation, also shows that the process is often flawed and the outcomes highly unsatisfactory. This is because despite its intentions to break through existing power imbalances between project proponents and resident populations, it fails to do so.

These imbalances show in differential access to political connections, money, legal support and information among and between company staff, forestry officials, local and supra-local elites, men and women, older and younger community members, Indigenous and non-Indigenous communities, and those whose rights to land are and are not recognized.

Such differences are exacerbated by the complex, bureaucratic nature of FPIC procedures, which through multiple steps eventually leads to a contractual agreement between parties that are highly uneven in terms of political leverage, knowledge-base and wealth (Bracamonte 2018, Buenafe *et al.* 2016, Persoon and Minter 2018). In the worst case, FPIC in practice is a process that is *not* free, *not* prior, *not* informed, while resulting in activities taking place *without* consent (Minter *et al.* 2012).

Fundamental but often unresolved issues include whose consent is actually to be sought and how community representation is to be organized in culturally meaningful and just ways. Young and Nkuintchua note that of the four Central African countries they studied, none has sufficient guidance in this respect. Likewise, in Solomon Islands, customary rules on collective decision-making processes are not safeguarded in forestry legislation. A comprehensive effort to counter these problems is the new version of the guidelines for the implementation of FPIC that FSC adopted in March 2021 after a long process of stakeholder consultation. Although this is a non-normative (i.e. non-prescriptive) document (FSC 2021: 9), it will be very important to document, monitor and evaluate experiences with and outcomes of this new guideline.

Grievance mechanisms

Another crucial element in ensuring that logging operations are socially equitable is having effective mechanisms for legal recourse if any party feels aggrieved (Young and Nkuintchua, this volume, see also VanClay 2020). However, grievance mechanisms are in many cases absent, dysfunctional or highly complex, which intentionally or not, serves to discourage local residents in logging operations to complain at all (Minter and van der Ploeg, this volume). In as far as grievance mechanisms are present, they tend to exist in contexts of poor

overall delivery of justice (Allen *et al.* 2013), which hampers their performance.

Young and Nkuintchua show that in the four African countries that are part of their legal review, conflict resolution mechanisms are under development as part of FLEGT-VPA initiatives. However, they also note that it is as yet unclear how these will provide recourse for citizens with grievances relating to their rights or benefits. They conclude that many VPA-related grievance mechanisms seem to stop at the establishment of dispute resolution mechanisms, and do not extend to whether they function, with transparency and accountability, or to how disputes have been resolved. Thus, Young and Nkuintchua warn that the onus will be on communities and civil society more broadly to improve documentation and presentation of complaints and keep written records of engagement with forestry or other officials.

A specific problem related to grievance mechanisms concerns damage compensation. This raises the fundamental question of what proper compensation consists of and whether damage and trespassing can be compensated for at all. This is highly culturally contextual and often locally contested. A fundamental problem is that in many situations, the 'logic' of damage compensation, namely that what was lost is commensurable with money, does not match local realities and institutions (Li 2013). Forest-based livelihoods, health, cultural identities, spiritual connections with past generations, attachment to place and violations of cultural taboos, simply have no monetary equivalent (Buenafe-Ze *et al.* 2016, VanClay 2020).

Smallholder voices

While most papers in this *Special Issue* focus on social impacts in relation to concession logging, the papers by Cromberg *et al.* and Kambugu *et al.* discuss the position of small-scale timber producers, processors and traders, who generally operate either in the margins of industrial concessions or in post-logging frontiers. While the legal frameworks of many countries acknowledge such operators, rules and regulations continue to be biased in favour of large-scale concessions (Kambugu *et al.*). This means, firstly, that smallholder interests and realities remain poorly represented in policy dialogues and reform processes; and secondly, that they continue to operate illegally.

Kambugu *et al.* specify this problem for the case of Uganda, where practically all sawn timber is informally produced by small-scale operators, who face legal barriers to formalize their business. The authors advocate for restraint in criminalizing the sector and recommend that policy makers reconsider overly stringent and technocratic regulation in view of actors' livelihood needs, emphasizing the need for 'do-no-harm' policies vis-à-vis the large number of currently informal operators and their families who depend on the informal timber business.

Cromberg *et al.* likewise demonstrate how the needs of smallholders in floodplain forests in the Brazilian Amazon, remain unaddressed in policy reforms. Although a Decree issued in 2013 aimed to respond to local realities and simplify the rules for formalization, the new requirements instead

increased complexity and reinforced smallholders' dependency on outside institutional and technical support. As a result, small-scale timber producers and traders continue to work in the shadows, with high transport costs and low selling prices.

Both papers emphasize that the failure to include smallholder voices results in a mismatch between licensing procedures and local harvesting and processing realities, which in turn forms a major barrier to legal operation.

Power

Implicit in all of the foregoing is the idea that addressing many of the current problems requires more effective stakeholder participation in impact assessment procedures, decision-making and benefit sharing negotiations. Indeed, participatory processes in which all stakeholders to a logging operation are represented are, in theory, at the heart of FPIC procedures, grievance mechanisms, proper auditing procedures and addressing small-holder needs. While a lack of such participatory processes certainly is a major cause of the presently poor social outcomes of logging operations, introducing them is no guarantee for more equitable outcomes.

This is because in their design and implementation, such processes rarely acknowledge and address the power-inequalities between stakeholders. Paradoxically, multistakeholder forums may therefore perpetuate the status quo by benefiting powerful actors and reconfirming the marginal position of Indigenous people, women, youth and other less powerful actors (Londres *et al.* 2021, Minter *et al.* 2014, Sarmiento Barletti and Larson 2021, Tsanga *et al.* 2014, Yami *et al.* 2021).

As our discussion of FPIC showed, in the context of logging operations, these power inequalities arise at many levels, in many shapes and they often mutually reinforce each other. Indeed, the FSC Guidelines on FPIC explicitly call for sensitivity to such disparities, noting that: '*Although the right to grant, withhold or withdraw consent empowers the affected rights holder, there are systemic inequalities and cultural barriers that may prevent their effective participation (FSC 2021: 12).*' But *how* these inequalities can be overcome, is another matter. Larson and Sarmiento Barletti (2020: 5) have found several key features of multi-stakeholders forums that were relatively successful in this respect. These include commitment to the process and its goals, which is demonstrated not only by resources and consistent follow-up, but also by time and willingness to listen to and learn from people, especially those with less powerful positions. The importance of an unrushed process and setting aside sufficient time likewise is a central element of FSC's FPIC guidelines: time to listen, time to deliberate, time to negotiate, and time to resolve disputes.

Yet, in the context of most logging operations, it is exactly time that is scarce. As an operations manager of a Malaysian logging company operating in Solomon Islands explained to the first author: '*[...] operations often stop because of disputes [...]. Landowners [...] don't know how to compromise. But [...], we don't have time to wait until they have resolved*

their disputes” (pers. Comm., April 16 2017) (Minter *et al.* 2018: 30). Moreover, even under perfect circumstances where company managers, forestry officials and local elites are excellent listeners and in no rush to achieve their goals, this will in itself not solve the issue of power imbalances. As Larson and Sarmiento Barletti (2020: 6) note, these imbalances may be such that local people cannot insist on their positions, and challenging discrimination and inequality often require structural institutional change.

Indeed, an alarming recent development shows how wealthy logging companies may actively capitalize on, rather than bridge power differences, by filing expensive lawsuits to silence critical activists, journalists and civil society organizations, through so-called SLAPPs (Strategic Lawsuits Against Public Participation⁵). In June 2021, certified⁶ logging company Samling filed a lawsuit against Malaysian NGO SAVE Rivers for publishing allegedly defamatory statements as part of its support of local communities in Sarawak, who have expressed concerns about the quality of FPIC and other community consultations conducted by Samling as part of the certification process. The logging company demands an apology, an order to stop SAVE Rivers from reporting community claims, and damage compensation amounting to over one million USD, which is 45 times the NGO’s annual budget. The SLAPP has effectively resulted in stalling the public complaint procedure (UN Special rapporteur on human rights defenders 2022).⁷

CONCLUSION: TOWARDS A WIDER PERSPECTIVE ON SUSTAINABLE FORESTRY

With the overall aim of putting the importance of the multiple social impacts of logging more prominently on the research and policy agenda, this *Special Issue* brings together in-depth studies on the subject from across the tropics. Together, they provide evidence that the many negative social impacts they reveal, are not just incidental phenomena occurring in isolation. Instead, they are systemic and symptomatic of a sector that is in urgent need of improvement.

In this introductory paper we have explored the commonalities between the papers. The web of activities and interactions that arise in and around logging operations, have profound impacts on local and Indigenous people’s livelihoods, their relationships with the forest and with each other. More specifically, while damage to local livelihoods is severe, local economic and development benefits of logging operations are highly disappointing. Women and Indigenous people benefit least from logging operations and are most negatively impacted by them. Logging operations are also commonly associated

with conflict between local residents and logging companies, as well as among and within communities. Alarming, sexual exploitation of women and girls is common in logging operations.

To address these issues, we call for a wider perspective on sustainable forest management (SFM). Although the social aspects of forestry are integral to common definitions of SFM, in forest policy, practice and research the environmental and economic aspects continue to take precedence. Moreover, such sensitivity to the social impacts of logging must not be limited to labour relations and conditions. These are of undeniable importance and much work remains to be done to achieve fair and reliable payment of forestry workers, as well as a safe and healthy workplace. However, as this *Special Issue* makes clear, the everyday social impacts of logging reach far beyond the immediate workplace and those employed in it. They are also felt for much longer than the duration of the logging operation itself, and may have spill-over effects to the rest of society.

On a more practical level, achieving more equitable outcomes of logging operations requires at least the following five things. While none of these are new, their materialization is lacking. First, the meaningful involvement of local communities prior to the awarding of concessions and throughout operations cannot be over-emphasized. The keyword here, however, is *meaningful* because, as this introduction and previous research has shown, issues of power continue to challenge equitable decision-making processes.

Second, precisely because of these power imbalances and because social impacts can be both material and immaterial, social impact assessments, FPIC procedures and social audits must be designed and carried out by independent, well-trained teams with in-depth social scientific knowledge and methodological skills.

Third, to avoid reproduction of the same gender-blindness and inequities that characterize the logging sector, such teams must be gender-balanced, and pay specific attention to the needs and interests of women, Indigenous communities and other marginalized groups.

Fourth, much more attention is needed for the design, implementation and monitoring of unambiguous, transparent mechanisms for benefit sharing between logging companies, local communities and government agencies. These mechanisms must be sensitive to intra-community diversity and the risk of reinforcement or creation of inequities.

Fifth, there is a need for much more effective grievance, compensation and dispute resolution mechanisms, which are tailored to local socio-political contexts and which facilitate, rather than hamper public complaint procedures. The spiritual and other immaterial values of forests for local communities must receive a much more central place in these mechanisms.

⁵ Several countries have passed legislation that aims, or can be used, to protect defenders against SLAPPs. See: [Business & Human Rights Resource Centre](#). The EU is working on a similar initiative.

⁶ Samling is certified under the Malaysian Timber Certification Scheme (MTCs), which is endorsed by the international timber certification body Programme for the Endorsement of Forest Certification (PEFC).

⁷ See also these publications by [Save Rivers](#) and [The Borneo Project](#) and these letters to [Samling](#) and the [Malaysian certification scheme MTCC](#).

In parallel to each of these practical conditions for socially equitable logging operations a future research agenda emerges. As industrial logging operations in human-inhabited tropical forests are expected to continue, they must be accompanied with long-term, empirical scrutiny. Even though certified concessions currently only form a small share of the tropical production forests, they beg specific enquiry. As they claim to represent current best practices of SFM, more evidence is needed to assess and understand the results of these efforts, in order to accelerate the much-needed transition to socially equitable logging.

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Logging and Indigenous peoples' well-being: an overview of the relevant international human rights jurisprudence

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HIGHLIGHTS

- Logging activities that occur in Indigenous peoples' traditional territories can have significant and wide-ranging effects on Indigenous peoples' rights, including well-being, cultural, land and participation rights.
- Preventing impacts on Indigenous peoples' well-being requires respect for Indigenous peoples' right to their lands and resources in the first instance.
- International human rights jurisprudence recognizes that respect for participation rights is an important safeguard to ensure protection of other rights of Indigenous peoples.
- Respect for Indigenous peoples' participation rights entails undertaking the following before commencing activities such as logging in Indigenous peoples' lands: conducting environmental and social impact assessments; engaging in consultations with the affected Indigenous peoples with the aim of obtaining Free, Prior, and Informed Consent; and agreeing on benefit sharing, compensation, prevention and mitigation measures.
- Although these requirements are well-established under international human rights law, many States have yet to comply with their treaty obligations, and in practice there is both limited incorporation of protections for Indigenous peoples' rights into national legislation and improper implementation of these requirements by States and non-State actors.

SUMMARY

Logging activities worldwide occur on lands that are already inhabited and used by Indigenous peoples and other local communities and often cause negative impacts on those communities. International human rights law provides one framework within which to understand these impacts. In particular, a discrete body of rights within international human rights law pertain to Indigenous peoples. Encroachments on Indigenous lands, such as through logging or other forestry operations, often run up against the full spectrum of Indigenous peoples' rights, all of which are interdependent and interconnected. Numerous human rights bodies, including the United Nations treaty bodies and regional human rights courts, have addressed Indigenous rights in the context of logging and other extractive activities. This article reviews existing jurisprudence elaborating the scope of these rights and explains how respect for land and participation rights can help prevent impacts on other rights. International human rights jurisprudence outlines three steps as core components of Indigenous peoples' participation rights and as safeguards to protect other rights: conduct environmental and social impact assessments; engage in consultations with the affected Indigenous peoples with the aim of obtaining free, prior, and informed consent; and agree on benefit sharing, compensation, prevention, and mitigation measures with the affected Indigenous peoples. However, these requirements, and respect for Indigenous peoples' rights more broadly, remain to be effectively implemented and observed in practice.

Keywords: Indigenous, human rights, international, jurisprudence, law

Exploitation du bois et bien-être des populations: vue d'ensemble de la jurisprudence internationale des droits de l'homme appropriée

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L'exploitation du bois s'effectue à travers le monde sur des terres préalablement habitées et utilisées par des peuples indigènes et d'autres communautés locales, et résultent souvent en des impacts négatifs qui affectent ces communautés. La loi internationale des droits de l'homme fournit un cadre à l'intérieur duquel ces impacts peuvent être compris. Un groupe discret de droits au sein des droits de l'homme internationaux concerne en particulier les peuplades indigènes. Les débordements sur leurs terres, telles que la coupe du bois ou d'autres opérations forestières vont souvent à l'encontre du spectre complet des droits indigènes, ces derniers étant tous interdépendants et interconnectés. Plusieurs corps des droits de l'homme, incluant des corps de traités et des cours régionales de droits de l'homme des Nations Unies, ont pris en compte les droits indigènes dans le contexte de la coupe du bois et d'autres activités d'extraction. Cet article examine la jurisprudence existante élaborant la portée de ces droits, et explique comment le respect pour la terre et les droits de participation peuvent aider à prévenir l'impact sur d'autres droits. La jurisprudence internationale des droits de l'homme dresse trois étapes, identifiées comme ingrédients-clé des droits des indigènes à la participation et comme des assurances pour protéger d'autres droits, mener des évaluations environnementales et d'impact social, s'engager dans des consultations avec les peuples indigènes touchés, visant à obtenir un consentement préalable libre et informé, et s'accorder sur un partage des bénéfices, des compensations, des préventions et des mesures d'atténuation avec les populations indigènes impactées.

La tala de árboles y el bienestar de los pueblos indígenas: una sinopsis de la jurisprudencia internacional en materia de derechos humanos

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En todo el mundo, las actividades de tala se realizan a menudo en tierras que ya están habitadas y son utilizadas por pueblos indígenas y otras comunidades locales, y por ello a menudo causan impactos negativos en esas comunidades. El derecho internacional de los derechos humanos ofrece un marco con el que entender estos impactos. En particular, una serie de derechos dentro de la legislación internacional de derechos humanos se refiere a los pueblos indígenas, y a la ocupación de tierras indígenas, como por ejemplo a través de la tala u otras operaciones forestales, y a menudo chocan con el espectro completo de derechos de los pueblos indígenas, todos los cuales son interdependientes y están interconectados. Numerosos organismos de derechos humanos, incluidos los órganos creados en virtud de tratados de las Naciones Unidas y los tribunales regionales de derechos humanos, han abordado los derechos de los indígenas en el contexto de la explotación forestal y otras actividades extractivas. Este artículo revisa la jurisprudencia existente que desarrolla el alcance de estos derechos y explica cómo el respeto a los derechos sobre la tierra y a la participación puede ayudar a prevenir impactos en otros derechos. La jurisprudencia internacional en materia de derechos humanos señala tres pasos como componentes básicos de los derechos de participación de los pueblos indígenas y como salvaguardias para proteger otros derechos: realizar evaluaciones de impacto ambiental y social; realizar consultas con los pueblos indígenas afectados, con el objetivo de obtener su consentimiento libre, previo e informado; y acordar la distribución de beneficios, la compensación, la prevención y las medidas de mitigación con los pueblos indígenas afectados.

INTRODUCTION

Logging concessions – along with the lands granted for mining, oil and gas, and agricultural concessions – are in many cases already inhabited by people¹. This situation has led to a recurring pattern in which legal logging and other extractive activities, in addition to illegal activities, have had negative impacts on forest inhabitants, including Indigenous peoples. Documented impacts include displacement, destruction or other loss of housing, restricted access to and decreased availability of food and medicinal resources, air and water pollution, decreases in nutritional value of foods, loss of cultural heritage, and other cultural infringements (FPP 2018, ACHPR 2017, IACHR 2016, TMP 2016).

Human rights law provides a useful framework for understanding some of these impacts and how they can be prevented. There is, in particular, a considerable body of human rights law that governs the rights of Indigenous peoples. This article will focus on how logging affects the rights of Indigenous peoples, and the guidance that jurisprudence on Indigenous rights can provide for how to prevent these impacts.² It will provide an overview of the scope of Indigenous peoples' rights as articulated by three United Nations human rights treaty bodies (the Human Rights Committee (HRC), the Committee on Economic, Social, and Cultural Rights (CESCR), and the Committee on the Elimination of Racial Discrimination (CERD)) and two regional human rights courts (the Inter-American Court of Human Rights and the African Court on Human and Peoples' Rights) (see Table 1). It concludes with a discussion on what this jurisprudence means, and what States and commercial logging companies

should do to respect Indigenous peoples' rights and prevent negative impacts on indigenous peoples' well-being.

INDIGENOUS PEOPLES' RIGHTS AFFECTED BY LOGGING ACTIVITIES

Logging activities occurring on Indigenous peoples' traditional lands have had significant negative impacts on Indigenous peoples, some of which arise from conflicts between loggers and community members. Indigenous human rights defenders have faced threats, intimidation, violence, and death for seeking to defend their land and environmental rights from commercial actors, including those in the logging sector (Global Witness 2020, SRHRD 2016). Indigenous peoples' lives and living conditions can be negatively impacted when they are resettled or otherwise displaced as a result of development or other activities. Lack of access to their traditional lands can result in deprivation of Indigenous peoples' means of subsistence, clean water, and traditional medicines (IACtHR 2005, IACtHR 2006, IACtHR 2010), substandard housing in urban centres, and poor health outcomes as a result of lack of access to forest-based food resources and livelihoods (SRAH 2018, SRM 2014).

Further impacts can arise from the effects of logging activities on the surrounding environment including pollution of water used by the communities, which can prevent Indigenous peoples from using their rivers for fishing and drinking and lead to negative health outcomes (SRRH 2019). More generally, the cutting down of forests can impede the ability of Indigenous peoples to engage in their traditional subsistence

¹ For example, one analysis in eight countries found that 93–99% of natural resource concessions were inhabited by people (Alforte, A. *et al.* 2014), while another found that in twelve countries studied, 31% of natural resource concessions overlapped demarcated lands held by indigenous peoples and non-indigenous local communities (de Leon, R. *et al.* 2013).

² Many of the principles of international human rights law discussed in this article can apply to non-indigenous forest peoples, as well, though the body of jurisprudence on the rights of these groups is less well-developed than for indigenous peoples (Mackay, F. 2013).

TABLE 1 *Human rights treaties and their associated treaty bodies or courts*

Treaty	Treaty body/Court	Scope
International Covenant on Civil and Political Rights (ICCPR)	Human Rights Committee (HRC)	Global
International Covenant on Economic, Social, and Cultural Rights (ICESCR)	Committee on Economic, Social, and Cultural Rights (CESCR)	Global
International Convention on the Elimination of All Forms of Racial Discrimination (ICERD)	Committee on the Elimination of Racial Discrimination (CERD)	Global
American Convention on Human Rights ('American Convention')	Inter-American Court of Human Rights (IACtHR)	Regional (Americas)
African (Banjul) Charter on Human and Peoples' Rights ('African Charter')	African Court on Human and Peoples' Rights (ACtHPR)	Regional (Africa)

lifestyles and cultural practices, including hunting, fishing, farming and small-scale mining (CERD 2017a, CERD 2016, CERD 2018a).

Many of these negative impacts can be described as violations of various rights of Indigenous peoples which will be discussed in more detail below. Human rights are defined in international treaties, which are binding upon the States that have ratified them, and elaborated upon in the decisions and recommendations of the courts and committees that monitor the implementation of those treaties. In addition to these bodies, the UN Human Rights Council has appointed special procedures, including special rapporteurs and independent experts, with the mandates to report and advise on particular human rights issues. The reports of these special mandate holders supplement the jurisprudence of the courts and treaty bodies and help shape the development of international human rights norms.

The distinct characteristics of Indigenous peoples and decades of advocacy have given rise to a discrete body of human rights law governing their rights. This body of law includes the ILO Convention No. 169, the only international treaty specifically on the topic of Indigenous peoples' rights; the UN Declaration on the Rights of Indigenous Peoples, a non-binding declaration which reflects a general agreement by States that Indigenous peoples have the rights set out therein; binding decisions and non-binding concluding observations and recommendations by UN human rights treaty bodies; binding decisions by regional human rights courts as well as non-binding recommendations by regional human rights commissions; and non-binding reports by UN special mandate holders. While formal decisions of these human rights bodies only bind States, these bodies have commented on businesses' responsibility to respect human rights (IACtHR 2015, CESCR 2017), and States' obligations often entail enacting the legislative and administrative measures necessary to ensure that other actors, such as businesses, respect human rights.

The rights of particular relevance in the context of Indigenous peoples and activities that exploit natural resources can be broadly grouped into four categories, namely, well-being rights; cultural rights; land, territory, and resource rights; and self-determination and related rights (Anaya, J. 2000). The impacts of logging on well-being and cultural rights can in

many cases arise out of violations of property and self-determination rights. This finding is not surprising given the interconnectedness of human rights. This suggests that respect for property and self-determination rights is critical to preventing violations of these other rights, and indeed, a significant portion of the international and regional jurisprudence on Indigenous peoples' rights focuses on the content of the latter two groups of rights.

Well-being rights

The most frequently described negative impacts of logging upon Indigenous peoples are usually impacts on well-being. These include impacts on the rights to life, security of the person, housing, health, water, food, livelihoods, education, environment, and development. Although the content of each right differs, and the rights are formulated differently in each treaty, UN treaty bodies and regional courts have similarly emphasized the importance of Indigenous peoples' access to their traditional lands, territories, and resources in realizing these rights.

UN treaty body jurisprudence on well-being rights

Many of the well-being rights are enshrined in the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social, and Cultural Rights (ICESCR), including: the rights to life (ICCPR Art. 6); security of the person (ICCPR Art. 9); housing (ICESCR Art. 11); health (ICESCR Art. 12); water (ICESCR Arts. 11–12); food (ICESCR Art. 11); livelihood (ICESCR Art. 6); and education (ICESCR, Art. 13). The International Covenant on the Elimination of All Forms of Racial Discrimination (ICERD) requires States to guarantee the right of everyone to equality before the law, including in the enjoyment of well-being rights (Art. 5).

The Human Rights Committee (HRC), Committee on Economic, Social, and Cultural Rights (CESCR), and Committee on the Elimination of Racial Discrimination (CERD) have each made clear that Indigenous peoples are a population that faces higher risks of well-being rights violations because their well-being depends upon access to their lands, territories, and resources. The HRC advises that protecting the right to life requires States to take special measures of

protection for certain vulnerable populations, including human rights defenders and Indigenous peoples (HRC 2019). The Committee further commented that the right to life extends to the right to a decent existence, recommending that States address societal conditions, such as the ‘deprivation of Indigenous peoples’ land, territories and resources’, that can either ‘give rise to direct threats to life or prevent individuals from enjoying their right to life with dignity’ (Ibid).

The CESCR has explained that protecting the rights in the ICESCR requires ensuring both the availability and accessibility of the resource or service at issue (CESCR 1991, CESCR 1999, CESCR 2000, CESCR 2002). For example, the right to food requires that food is available in a quantity and quality that is sufficient to satisfy dietary needs and is culturally acceptable (CESCR 1999). The food should also be economically and physically accessible, to both present and future generations (Ibid). The Committee noted that Indigenous peoples are particularly vulnerable to the risk of inaccessibility of food if their ‘access to their ancestral lands may be threatened’ (Ibid).

In elaborating upon the right to health, the Committee recommended that States enact specific, culturally appropriate measures to improve Indigenous peoples’ access to health services and care (CESCR 2000). It additionally recommended that States ‘provide resources for Indigenous peoples to design, deliver and control such services’ and protect the ‘vital medicinal plants, animals and minerals necessary to the full enjoyment of health of Indigenous people’ (Ibid). The Committee warned that development activities that result in ‘the displacement of Indigenous peoples against their will from their traditional territories and environment, denying them their sources of nutrition and breaking their symbiotic relationship with their lands, has a deleterious effect on their health’ (Ibid). Similarly, the Committee recommended that Indigenous peoples’ ‘access to water resources on their ancestral lands is protected from encroachment and unlawful pollution’ and that States ‘provide resources for Indigenous peoples to design, deliver and control their access to water’ (CESCR 2002).

The CERD has, in numerous concluding observations and recommendations, urged States to take measures to ensure that Indigenous peoples do not experience discriminatory impacts on their well-being. For example, it has recommended that States implement safeguards against negative environmental impacts of natural-resource exploitation activities to prevent detriment to Indigenous peoples’ living conditions, and that they support Indigenous peoples’ traditional ways of life (CERD 2016, CERD 2017a). It has also recommended that States prevent the preferencing of commercial interests over Indigenous peoples’ rights, for example by ensuring that use of water by extractive industries does not impair access to water by Indigenous peoples (Ibid).

Regional court jurisprudence on well-being rights

The Inter-American Court and the African Court have each taken different approaches towards well-being rights, but they have both similarly linked Indigenous peoples’ well-being to

access to their traditional lands and resources. The Inter-American Court has examined Indigenous peoples’ well-being rights through Articles 4 and 26 of the American Convention on Human Rights, which protect the right to life and obligate States to take measures towards the progressive realization of economic, social, and cultural rights, respectively. The American Convention does not have provisions protecting specific economic, cultural, and social rights.

The Inter-American Court considered that the realization of all other rights depends upon the right to life, and that the right to life necessarily obligates the State not to create ‘conditions that impede or obstruct access to a decent existence’ (IACtHR 2005). Instead, the State must take ‘positive, concrete measures geared toward fulfilment of the right to a decent life’ (Ibid). The Court clarified that this does not impose impossible burdens upon the State, but that the obligation arises when the State has knowledge of a situation that poses a risk to life and there are measures the State could adopt to prevent or avoid the risk (IACtHR 2006).

The Court has found in several cases that, where the State had generated conditions affecting the ability of an Indigenous community to have a ‘decent life’, the State had violated the community members’ right to life (IACtHR 2005, IACtHR 2006, IACtHR 2010). In each of these cases, the conditions negatively impacting upon the right to a decent life were related to the inability of the Indigenous community concerned to access and enjoy their traditional lands. The Court explicitly linked infringements on the rights to health, food, and clean water to negative impacts on the right to a decent existence and also to conditions that make more difficult the realization of other rights, such as the right to education and to cultural integrity (IACtHR 2005). The Court later, citing norms established by the CESCR, elaborated that the rights to water and food required that water and food be accessible and of adequate quality and quantity (IACtHR 2010); and that the rights to health and education required that services be accessible, acceptable, and culturally appropriate (Ibid). Moreover, in certain cases where evidence suggests that specific community members’ deaths were known or should have been known to the State and preventable, those deaths may be attributable to the State as a violation of the right to life (IACtHR 2006, IACtHR 2010).

In its most recent case on Indigenous rights, the Court established that the rights to environment, food, water, and cultural identity can be derived from Article 26 of the American Convention. The Court held that States have a duty to prevent environmental damage and to restore the environment where damage was not preventable (IACtHR 2020). In fulfilling this duty, States must take into consideration groups, such as Indigenous peoples, particularly vulnerable to environmental damage (Ibid). The Court drew on the jurisprudence of the CESCR to explain that the right to food requires that food is available, and that it is physically and economically accessible, and culturally acceptable, to present and future generations (Ibid). Again referencing the CESCR, the Court held that the right to water encompasses access to sufficient and safe water (Ibid). Finally, the Court held that States must adopt measures to allow Indigenous peoples to participate in

cultural life and that prevent others from interfering with their cultural practices (Ibid). These rights are all interdependent, and the failure to respect any one right can lead to infringements upon the others (Ibid).

The African Court has approached Indigenous peoples' well-being rights through the African Charter, Article 4, on the right to life, and Article 22, on the right to development. Like the Inter-American Court, the African Court agreed that the right to life is the foundational right, upon which the realization of all other rights depends (ACtHPR 2017). However, the Court distinguished the right to life as relating to the 'physical rather than the existential understanding of the right to life' and thus, the creation of conditions 'unfavourable to a decent life' do not 'necessarily result in the violation of the right to life' (Ibid). As a result, even where eviction of an Indigenous community from their ancestral lands 'adversely affected their decent existence in the forest', the Court found no violation of the right to life (Ibid).

The right to development in the African Charter refers to 'economic, social, and cultural development' (Art. 21(1)). The African Court found that this right should be read together with the right to development as formulated in the UN Declaration on the Rights of Indigenous Peoples, Art. 23, to include the right to be 'actively involved in developing and determining health, housing, and other economic and social programmes affecting them' (Ibid). In this case, the Court found a violation of the right to development because the Indigenous community had been evicted from their ancestral lands, suffering an adverse impact on their development, and they had not been actively involved in developing socioeconomic programmes affecting them (Ibid).

Cultural rights

The right to culture includes the right of groups to maintain their distinctive cultures and the right to take part in cultural life. 'Culture' is defined broadly, encompassing, 'in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs' (UNESCO 2001). Human rights bodies have generally agreed that for Indigenous peoples, culture includes specific relationships with their territories and lands.

UN treaty body jurisprudence on cultural rights

The HRC, CESCR, and CERD have affirmed the cross-cutting nature of Indigenous people's culture and emphasized that protection of the right to culture requires protection of Indigenous peoples' ways of life. The HRC has, through several binding decisions, as well as other recommendations, elaborated on the meaning of ICCPR, Article 27, which protects the right of minorities, 'in community with the other members of their group, to enjoy their own culture, to profess and practise their own religion, or to use their own language'. The HRC has observed generally that culture may manifest in different forms and 'may consist in a way of life which is closely associated with territory and use of its resources' (HRC 1994a).

In a series of decisions, the HRC established that the right to culture includes the 'right of persons, in community with others, to engage in economic and social activities which are part of the culture of the community to which they belong' (HRC 1990). The economic component of this right is not limited to 'traditional means of livelihood of national minorities'; it includes the adaptation of those livelihoods with the help of modern technology (HRC 1994b). Importantly, Article 27 protects the right of minority members to be able to continue to benefit from their cultural practices (Ibid). Historic inequities and recent developments can both violate Article 27 (HRC 1990), as can the 'combined effects of a series of actions or measures taken ... over a period of time and in more than one area of the State occupied by that minority' (HRC 2005). The HRC has made clear that not all development activities would necessarily be considered violations of Article 27; instead, measures with 'a certain limited impact on the way of life of persons belonging to a minority' may be acceptable, provided that the members of the minority are not denied the right to enjoy their culture (HRC 1994b).

The ICESCR, Art. 15 protects the right to 'take part in cultural life'. The CESCR has commented on the importance of protecting Indigenous peoples' cultural values 'associated with their ancestral lands' to 'prevent the degradation of their particular way of life, including their means of subsistence, the loss of their natural resources and, ultimately, their cultural identity' (CESCR 2009). The Committee additionally observed that Indigenous peoples' cultural rights associated with traditional lands are particularly vulnerable in the context of business activities (CESCR 2017).

The CERD has similarly called upon States to 'Recognize and respect Indigenous distinct culture, history, language and way of life ... and to promote its preservation', and to 'Ensure that Indigenous communities can exercise their rights to practise and revitalize their cultural traditions and customs and to preserve and to practise their languages' (CERD 1997). The Committee has also advised that States take the 'cultural specificities' of Indigenous peoples into account when adopting measures to fulfil other rights, such as the rights to health and education (CERD 2019).

Regional courts jurisprudence on cultural rights

The regional courts have also taken note of the integral part that Indigenous peoples' relationships with their lands play in their cultural identities. The American Convention on Human Rights does not provide for a specific right to culture. The Inter-American Court has instead addressed cultural rights primarily in the context of other rights, notably land rights.

The integral nature of Indigenous peoples' relationships with their lands to their cultures has been used by the Inter-American Court as a benchmark for assessing appropriate restrictions on land rights and compensation for those restrictions. When determining whether Indigenous territorial rights can be restricted, the Court has required States to take into account that Indigenous territorial rights are 'a necessary condition for reproduction of their culture, for their own development and to carry out their life aspirations' and that disregarding Indigenous land rights 'could affect other basic

rights, such as the right to cultural identity and to the very survival of the Indigenous communities and their members' (IACtHR 2005). As such, in cases where private property rights compete with Indigenous property rights, restricting those private property rights 'might be necessary to attain the collective objective of preserving cultural identities in a democratic and pluralist society' (Ibid). The Court cautioned that this does not mean Indigenous communal property interests must always prevail over individual interests; nevertheless, where private interests prevail, States must pay compensation to the affected Indigenous peoples according to the 'meaning of the land' for the Indigenous people (Ibid).

However, the interests and rights of Indigenous peoples must prevail if any restrictions on their property rights would endanger their 'survival as a people' (IACtHR 2007). The Court defined this standard, again, in terms of culture. 'Survival' in this context means the ability of the Indigenous people to 'continue living their traditional way of life, and that their distinct cultural identity, social structure, economic system, customs, beliefs and traditions are respected, guaranteed and protected' (IACtHR 2008).

The African Charter, by contrast, provides explicitly for the right for every person to 'take part in the cultural life of his community' (Art. 17(2)). Like the UN treaty bodies and the Inter-American Court, the African Court defined culture broadly to encompass the 'total way of life of a particular group, including the group's languages, symbols... the manner the group constructs shelters; engages in certain economic activities, produces items for survival; rituals ... and shared values of its members' (ACtHPR 2017). The Court noted that the right to culture requires not just 'the duty, not to destroy or deliberately weaken minority groups, but requires respect for, and protection of, their cultural heritage essential to the group's identity' (Ibid). The Court found that Indigenous peoples are particularly vulnerable to loss of culture because of economic development programs and their unique ways of life (Ibid). However, the right to culture is not absolute. The Court noted that, in general, rights might be restricted in the common interest and if the interference with the right is necessary and proportional to a legitimate aim (Ibid).

Land, territory, and resource rights

As discussed above, Indigenous peoples' access to and enjoyment of their lands, territories, and resources have been recognized as crucially important to the fulfilment of their well-being and cultural rights. Accordingly, there is general agreement in the human rights jurisprudence that Indigenous peoples have rights to their lands, territories, and natural resources.

UN treaty body jurisprudence on land rights

The HRC, CESCR, and CERD have affirmed the collective rights of Indigenous peoples to their traditional lands and resources. The HRC has, for example, recommended that States legally protect the right of Indigenous peoples to their ancestral lands and natural resources (HRC 2017a, HRC 2016), including by granting collective land titles (HRC

2018). The CESCR has similarly recommended that States 'guarantee the right of Indigenous peoples to dispose freely of their lands, territories and natural resources, by such means as providing legal recognition and the necessary legal protection' (CESCR 2015, CESCR 2019).

The ICERD requires States to prohibit discrimination in the enjoyment of the 'right to own property alone as well as in association with others' (Art. 5(d)(v)). The CERD elaborated upon this right in its General Recommendation No. 23, calling upon States to 'recognize and protect the rights of Indigenous peoples to own, develop, control and use their communal lands, territories and resources' (CERD 1997). The Committee has consistently recommended that States protect these rights by, for example, implementing legislation or legally recognizing Indigenous peoples' collective rights to own, use, develop, and control their lands, territories and resources (CERD 2020, CERD 2017b).

Regional courts jurisprudence on land rights

The Inter-American Court has elaborated extensively upon the precise details of Indigenous peoples' property rights. In its landmark decision on Indigenous property rights, the Court concluded that the right to property, enshrined in Article 21 of the American Convention, protects 'the rights of members of the Indigenous communities within the framework of communal property' (IACtHR 2001). This right derives from their customary laws and practices and entitles them to seek official recognition and registration of their property (Ibid).

The scope of this right extends to those lands traditionally possessed by the Indigenous people, even if they had unwillingly lost possession of those lands (IACtHR 2006). The property rights of Indigenous peoples include 'full guarantees over the territories they have traditionally owned, occupied and used in order to ensure their particular way of life, and their subsistence, traditions, culture, and development as peoples', as well as necessary access and use over additional areas they have traditionally accessed for other purposes (IACtHR 2015).

The property rights of Indigenous peoples extend to their natural resources, as well. The American Convention does not specifically mention a right to natural resources. However, without the ability to use and enjoy their natural resources, 'the very physical and cultural survival of such [Indigenous] peoples is at stake'. Because of this, the protections afforded by Article 21 encompass not only lands but also 'those natural resources traditionally used and necessary for the very survival, development and continuation of such people's way of life' (IACtHR 2007).

The right to property, however, as with most human rights, is not absolute, so restrictions on this right can be made, if they are established by law, necessary, proportional, and aimed to 'attain a legitimate goal in a democratic society' (IACtHR 2005). The Court added that in the context of Indigenous peoples, an additional factor is 'whether the restriction amounts to a denial of [the Indigenous people's] traditions and customs in a way that endangers the very survival of the group and of its members' (IACtHR 2007). As discussed previously, this criterion refers to both the physical and cultural survival of the community.

The African Court has similarly concluded that the right to property, found in Article 14 of the African Charter, can be a collective right (ACtHPR 2017). The Court found that Indigenous peoples have the right to occupy, use, and enjoy their ancestral lands (Ibid).³ This is separate from the right to natural resources, as the African Charter, Article 21, includes a specific right to natural resources. The Court found that this right exists for Indigenous communities (Ibid), and that the right of Indigenous people to their ancestral lands, particularly the rights to use and enjoy the produce of the land, 'presuppose[s] the right of access to and occupation of the land', and that violations of such rights also imply violations of the right to 'enjoy and freely dispose of' the resources produced by those ancestral lands (Ibid).

Right to self-determination and related rights

The fourth category of rights of Indigenous peoples (referred to in this article as 'participation rights') includes the rights to self-determination, internal autonomy, effective participation, consultation, and Free, Prior, and Informed Consent ('FPIC'). This bundle of rights can be thought of as both the basis of and arising out of Indigenous peoples' land rights. On the one hand, for instance, the right to self-determination as formulated in the ICCPR and ICESCR Article 1 includes the right to 'freely dispose of their natural wealth and resources'. On the other, property rights, encompassing the rights to own, occupy, use, and control the land and natural resources, imply a right to make decisions affecting those lands and resources. The human rights treaty bodies have commented extensively upon these participation rights as important safeguards for protecting land and other rights.

UN treaty body jurisprudence on the right to self-determination

The right to self-determination is enshrined in both the ICCPR and ICESCR Article 1. It includes the right of peoples to 'freely determine their political status and freely pursue their economic, social and cultural development' and to 'freely dispose of their natural wealth and resources'. The HRC has observed that the right of peoples to self-determination and to dispose of their natural resources is 'an essential condition for the effective guarantee and observance of individual human rights and for the promotion and strengthening of those rights' (HRC 1990). The Committee has recommended that States ensure 'the effective participation of members of minority communities in decisions which affect them' (HRC 1994a). The safeguard of the right to effective participation 'is directed to ensure the survival and continued development of cultural identity...' (HRC 2009). Where actions may substantially interfere with a minority community's culturally important activities, then obtaining the FPIC of the community may be required (Ibid; HRC 2017b). Determining the potential impact on the community's activities should involve the

conduct of an independent impact assessment, and where the State allows the activity to proceed, it should put in place mitigation and compensation measures (HRC 2009).

The CESCR has recommended that States take 'necessary legislative and administrative measures to ensure that the free and informed prior consent of Indigenous peoples is obtained with regard to decisions that may directly affect the exercise of their economic, social and cultural rights' (Ibid; CESCR 2019). The Committee has specified that it is not only States that must obtain FPIC; businesses should also respect Indigenous peoples' right to FPIC, and States should enact legislative or other measures to hold businesses accountable (CESCR 2017). The requirement to obtain FPIC necessitates consultation with Indigenous peoples through their representative institutions before concessions are even granted, and the consultation process should proceed in accordance with protocols agreed with the Indigenous community (CESCR 2017, CESCR 2018). States should develop guidelines to evaluate the human rights impact of extractive projects, particularly when they involve Indigenous peoples' rights (CESCR 2019, CESCR 2017). The impact assessment and consultation process should not only identify the potential and actual impacts of the project or activity, it should also involve the design of prevention, mitigation, and compensation measures, as well as a benefit sharing mechanism (Ibid).

The CERD called upon States to ensure that Indigenous peoples 'have equal rights in respect of effective participation in public life and that no decisions directly relating to their rights and interests are taken without their informed consent' (CERD 1997). Specifically in the context of land rights, the CERD observed that States should take measures to return Indigenous peoples' traditional lands and territories 'where they have been deprived of their lands and territories traditionally owned or otherwise inhabited or used without their free and informed consent' (Ibid).

The CERD has recommended numerous times that States consult with Indigenous peoples with a view to obtaining their FPIC on any project, activity, legislative, or administrative measure likely to affect their rights, particularly their property rights (CERD 2020, CERD 2019, CERD 2018b, CERD 2015). It has additionally recommended that States ensure that independent environmental and human rights impact assessments are carried out prior to granting permits for development activities in the territories of Indigenous peoples (CERD 2020, CERD 2019, CERD 2018b, CERD 2015). Consultation processes with affected Indigenous peoples should also design measures for mitigation, compensation, and benefit sharing (CERD 2020, CERD 2019, CERD 2018b).

Regional courts jurisprudence on the right to self-determination

The Inter-American and African Courts have similarly found participation rights to be important mechanisms for

³ The African Court's formulation notably does not include the right to ownership of land. The Court analysed the right to property in the context of the UNDRIP and concluded that indigenous property rights 'do not necessarily entail the right of ownership in its classical meaning, including the right to dispose thereof', but rather emphasise the rights of possession, occupation, and use (ACtHPR 2017, para 127).

the protection of other rights. As explained above, the Inter-American Court established that any restriction on Indigenous peoples' property rights must, in addition to other requirements, not deny the survival of the community and its members (IACtHR 2007). In order to guarantee this, the State must ensure: 1) Indigenous peoples' 'effective participation ... in conformity with their customs and traditions', in decision-making around any 'development, investment, exploration or extraction plan' affecting their territory; 2) Indigenous peoples receive 'a reasonable benefit' from any such project; 3) the conduct of an independent, prior environmental and social impact assessment; and 4) 'adequate safeguards and mechanisms' that ensure that the project does not 'significantly affect the traditional [Indigenous] lands and natural resources' (Ibid).

The right to effective participation in decision-making entails the right to be actively consulted from the early stages of a development plan – before exploration, exploitation, or extraction (IACtHR 2007, IACtHR 2015) – and continues 'at all stages of the planning and implementation of a project' (IACtHR 2012). The possible risks of the project, especially potential environmental and health impacts, must be fully enumerated, and the consultation must be 'in good faith, through culturally appropriate procedures and with the objective of reaching an agreement' (IACtHR 2007). The Court explained that respecting culturally appropriate procedures and traditional decision-making means that it is for the Indigenous people to decide who represents them in the consultation process (IACtHR 2008). For large-scale projects that would have a major impact on a large part of the Indigenous peoples' territory, the right to effective participation extends to the right to free, prior, and informed consent (IACtHR 2007).

The second safeguard of benefit sharing is 'inherent' to the right, under Article 21(2) of the American Convention, to compensation for deprivation of property rights (Ibid). This right applies not only to the deprivation of property title, but also to 'the deprivation of the regular use and enjoyment of such property' (Ibid). The beneficiaries must be determined in consultation with the Indigenous people (IACtHR 2008). The Court emphasized that the benefit must be 'direct' and 'mutually-agreed' (IACtHR 2015).

The third safeguard is a core component of the first. Environmental and social impact assessments ('ESIAs') must provide some 'objective measure of such possible impact on the land and the people' and ensure that the Indigenous people are aware of possible risks, including environmental and health risks, of a proposed project (IACtHR 2008). They must additionally address the cumulative impacts of existing and proposed projects to allow for a more accurate assessment of the proposed project's impacts (Ibid). ESIAs must be conducted by 'independent and technically capable entities', conform to international standards and best practices, respect Indigenous traditions and culture, and they must be completed

before a concession is even granted (Ibid). Finally, the State must 'observe, monitor, supervise, or participate' in consultation processes (IACtHR 2012) and supervise the conduct of impact assessments (IACtHR 2008).

The African Court has not directly held that consultation or consent are requirements for infringements of Indigenous peoples' property rights. It has instead implied that consultation is a factor in a determination of rights violations. For example, it found a violation of an Indigenous community's property rights where the community was evicted from its traditional territory without consultation and without an adequate public interest justification (ACtHPR 2017). The Court similarly implied that consultation and participation are requirements in protecting the right to development. The Court found a violation of the right to development where an Indigenous community had been evicted from its ancestral lands 'without being effectively consulted' and where they had not been 'actively involved' in determining socioeconomic programmes affecting them (Ibid).

DISCUSSION

Logging activities can begin to impact Indigenous peoples' rights from the moment that the decision is made to grant a logging concession or to commence logging in lands traditionally owned, used, and occupied by Indigenous peoples. The very decision itself, including the assessment of whether those particular lands are Indigenous peoples' lands or not, impacts upon Indigenous peoples' land and participation rights. Once logging activity commences, it can negatively affect a range of Indigenous peoples' well-being and cultural rights, ranging from impacts on life and living conditions to impacts on health, livelihoods, and traditional practices.

To prevent these harmful rights infringements, States and logging companies should follow the guidance provided by human rights treaty bodies and ensure that they do the following prior to granting or obtaining any logging concessions and commencing logging operations:

1. Conduct an independent human rights impact assessment. This should serve as an objective measure of potential economic, social, cultural, and other human rights impacts of the project. For example, it should assess possible impacts of the logging activity on the Indigenous community's access to clean water, access to food, livelihood activities, practice of traditional medicine, and cultural practices. It should also assess prevention and mitigation measures.
2. Ensure that the affected Indigenous peoples are actively participating in decision-making around the project. This includes consulting with the community through their chosen representative institution with the aim of obtaining the community's FPIC to the project.⁴ Part

⁴ The general rule under international human rights law is that natural resource-extractive activities should not take place on indigenous lands without FPIC. However, the scope of the FPIC requirement is not unlimited. For a discussion of the limitations on the right, see SRIP 2013.

of the consultation process involves sharing the findings of the impact assessment so that the community can be fully informed of the possible risks of the project when making their decision.

3. Agree with the Indigenous community concerned on prevention and mitigation measures, compensation for any harms suffered, and benefit-sharing mechanisms.

The above-listed steps are by now well-established components of the participation rights of Indigenous peoples under international human rights law. Aspects of these requirements are becoming incorporated into national legislation in some States and into the policies of international organizations and corporations (EMRIP 2018). In the forestry sector, the Forest Stewardship Council and Programme for the Endorsement of Forest Certification sustainable forestry certification standards both require forestry operators to recognize the right to FPIC in some form (FSC 2015 and PEFC 2018). However, State compliance with treaty obligations and incorporation of protection of Indigenous rights into national legislation varies, and even where these obligations have been incorporated into legislation or policy, proper implementation of these requirements remains lacking in practice. Reported problems with implementation of participation rights generally include, among others, the failure to recognize that Indigenous communities in the area have land and participation rights (SRIP 2013, FPP 2018); the decoupling of the above steps and non-integration of, for instance, impact assessment processes as components within an FPIC process (Schilling-Vacaflor 2019, McNabb, C. 2018); failure to explain and lack of community understanding of the terms or consequences of agreements they are entering into (FPP 2015, FPP 2018, FPP 2020); and lack of clarity about Indigenous peoples' right to withhold consent (EMRIP 2018).

The improper implementation of FPIC appears to arise out of a misunderstanding or misconstrual of the content of Indigenous peoples' participation rights under international law as being merely procedural hurdles to legitimization of extractive projects by Indigenous peoples (EMRIP 2018). Case studies suggest that even where proponent-driven or government-led processes include Indigenous peoples' participation, they are often inadequate in enabling full and free deliberation by Indigenous peoples (Papillon, M. and Rodon, T. 2017, Merino, R. 2018). By contrast, FPIC may be more successfully operationalized where Indigenous communities develop – and governments and companies follow – their own mechanisms to implement FPIC, such as FPIC protocols or community-driven impact assessments (Papillon, M. and T. Rodon. 2019, Fredericks, C. 2017). While not all communities have the resources or capacity to develop and implement such mechanisms, the broader lesson is perhaps simply that government and corporate actors cannot comply with international human rights standards while ignoring the agency of Indigenous peoples to make decisions that impact them or failing to rectify power imbalances that may impact decision-making processes (SRIP 2013, EMRIP 2018). What this means for the logging sector is that preventing negative impacts on Indigenous peoples' well-being requires devoting

time and resources to ensure that Indigenous peoples are able to fully exercise their rights to participate actively and effectively in decision-making around the logging activities that may affect them.

LIST OF ABBREVIATIONS

ACHPR	African Commission on Human and Peoples' Rights
ACtHPR	African Court on Human and Peoples' Rights
CERD	Committee on the Elimination of Racial Discrimination
CESCR	Committee on Economic, Social, and Cultural Rights
EMRIP	Expert Mechanism on the Rights of Indigenous Peoples
HRC	Human Rights Committee
IACHR	Inter-American Commission on Human Rights
IACtHR	Inter-American Court of Human Rights
ICCPR	International Covenant on Civil and Political Rights
ICERD	International Convention on the Elimination of All Forms of Racial Discrimination
ICESCR	International Covenant on Economic, Social, and Cultural Rights
SRIP	Special Rapporteur on the Rights of Indigenous Peoples
UN	United Nations

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Social obligations in the logging sector in Cameroon, Ghana, Liberia and Republic of Congo

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HIGHLIGHTS

- Obligations of logging companies to share revenue and make contributions in kind to affected communities are a legal requirement in all four countries studied.
- They are commonly referred to as benefit sharing or social agreements, diminishing their legal basis, hence the preferred term – social obligations.
- Legal frameworks on social obligations are complex, incomplete and precarious, leading to communities and the State not reaping the benefits they are owed by law.
- Their complexity renders social obligation systems open to abuse at many levels. Their intent might be to decentralise power but this often allows local elites to stand in the way of community members and capture most benefits.
- While comparison between countries is difficult, best practices identified on specific aspects in all countries are evidence that improvements are possible.

SUMMARY

This paper offers a critical review of the social obligations (revenue redistribution, direct payments, payments in kind, and access to justice or compensation) of logging concessionaires to affected communities in Cameroon, Ghana, Liberia and Republic of Congo. The research draws on a full desk-review of relevant legal texts, and consultation with leading non-governmental organisations working in the forest sector in the four countries. It appears that the legal foundation of social obligations is mainly shaped by national context, and therefore important differences can be observed across countries. However, they are complex, incomplete and precarious, providing opportunities for elite capture, and communities – and the State – not reaping the benefits they are owed by law. A key conclusion is that legality-licensing schemes such as under a Voluntary Partnership Agreement (VPA) with the European Union (EU) tend to downplay social obligations compared to other aspects of legal compliance.

Keywords: social obligations, logging permits, rule of law, social impacts, Voluntary Partnership Agreements

Obligations sociales dans le secteur de l'exploitation forestière au Cameroun, Ghana, Libéria et République du Congo

D. YOUNG et T. NKUINTCHUA

Cet article propose un examen critique des obligations sociales (redistribution des revenus, paiements directs, paiements en nature, et accès à la justice ou à la compensation) des concessionnaires forestiers vis-à-vis des communautés affectées au Cameroun, en République du Congo, au Ghana et au Libéria. La recherche s'appuie sur une revue complète des textes juridiques pertinents et sur la consultation des principales organisations non gouvernementales travaillant dans le secteur forestier dans les quatre pays. Il apparaît que le fondement juridique des obligations sociales est principalement façonné par le contexte national, et que des différences importantes peuvent donc être observées entre les pays. Cependant, les obligations sociales sont complexes, incomplètes et précaires, offrant des possibilités de captation par les élites, ainsi, les communautés – et l'État – ne récoltent pas les bénéfices qui leur sont dus par la loi. L'une des principales conclusions est que les systèmes de licence de légalité, comme dans le cadre d'un accord de partenariat volontaire (APV) avec l'Union européenne (UE), ont tendance à minimiser les obligations sociales par rapport à d'autres aspects de la conformité légale.

Obligaciones sociales en el sector maderero de Camerún, Ghana, Liberia y República del Congo

D. YOUNG y T. NKUINTCHUA

Este artículo ofrece una revisión crítica de las obligaciones sociales (redistribución de ingresos, pagos directos, pagos en especie y acceso a la justicia o compensación) de las empresas concesionarias de explotaciones forestales con las comunidades afectadas en Camerún, República del Congo, Ghana y Liberia. La investigación se basa en una revisión completa de los textos legales pertinentes y en consultas con las principales organizaciones no gubernamentales que trabajan en el sector forestal en los cuatro países. Al parecer, el fundamento jurídico de las obligaciones sociales está moldeado principalmente por el contexto nacional, por lo que se observan importantes diferencias entre países. Sin embargo, las obligaciones sociales son complejas, incompletas y precarias, lo que ofrece oportunidades para la captura por la élite y para que las comunidades, y el Estado, no obtengan los beneficios que les corresponden por ley. Una conclusión clave es que los regímenes de concesión de licencias de legalidad, como los de los Acuerdos Voluntarios de Asociación (AVA) con la Unión Europea (UE), tienden a restar importancia a las obligaciones sociales, en comparación con otros aspectos del cumplimiento legal.

INTRODUCTION

The literature on sustainable logging is predominantly oriented towards the environmental aspects of sustainability. Meanwhile, the social aspects of logging remain under-researched and poorly addressed (Cerutti *et al.* 2014). This is particularly true for the question of how much communities actually benefit from logging (Young 2017). The forest sectors in Cameroon, Ghana, Liberia and Republic of Congo (RoC) (see Map 1) – as with many other forest-rich developing countries – are largely orientated towards large-scale logging concessions that are allocated to private companies by the State (Agrawal *et al.* 2008, Van Hensbergen 2016). At the same time these countries are characterised by a strong sense of customary community ownership of land and thus of forests, which is not fully recognised in law (Molnar *et al.* 2004, Rights and Resources Initiative 2015). As a result, a tension over rights to the forest resource exists, and in an effort to ameliorate this, the legal frameworks for forest management in all four countries include a requirement for some form of benefit sharing mechanism to redirect money from a profitable industry towards social development.

This paper seeks to critically review the legal texts governing this form of social contract, whereby the State allocates public forests to concessionaires on condition that the latter forge some sort of agreement with affected communities. Given the diverse legal language in each country, the paper uses the term ‘social obligations’ rather than benefit sharing, to emphasise that the relevant codes of conduct, payments and other contributions are a legal requirement for logging operations, not an optional corporate act of social responsibility by the companies involved. Social obligations are often poorly understood and weakly enforced, underlining the need to have a full understanding of their legal basis before improving their implementation (Defo 2020). The paper identifies and examines the legal frameworks around the following modes of social obligation: distribution of area- and volume-based taxes, fees or royalties, payments in kind, and legal recourse (compensation).

Whilst the focus is on affected communities as local recipients, the paper also covers redistribution to local government authorities and traditional authorities. It does

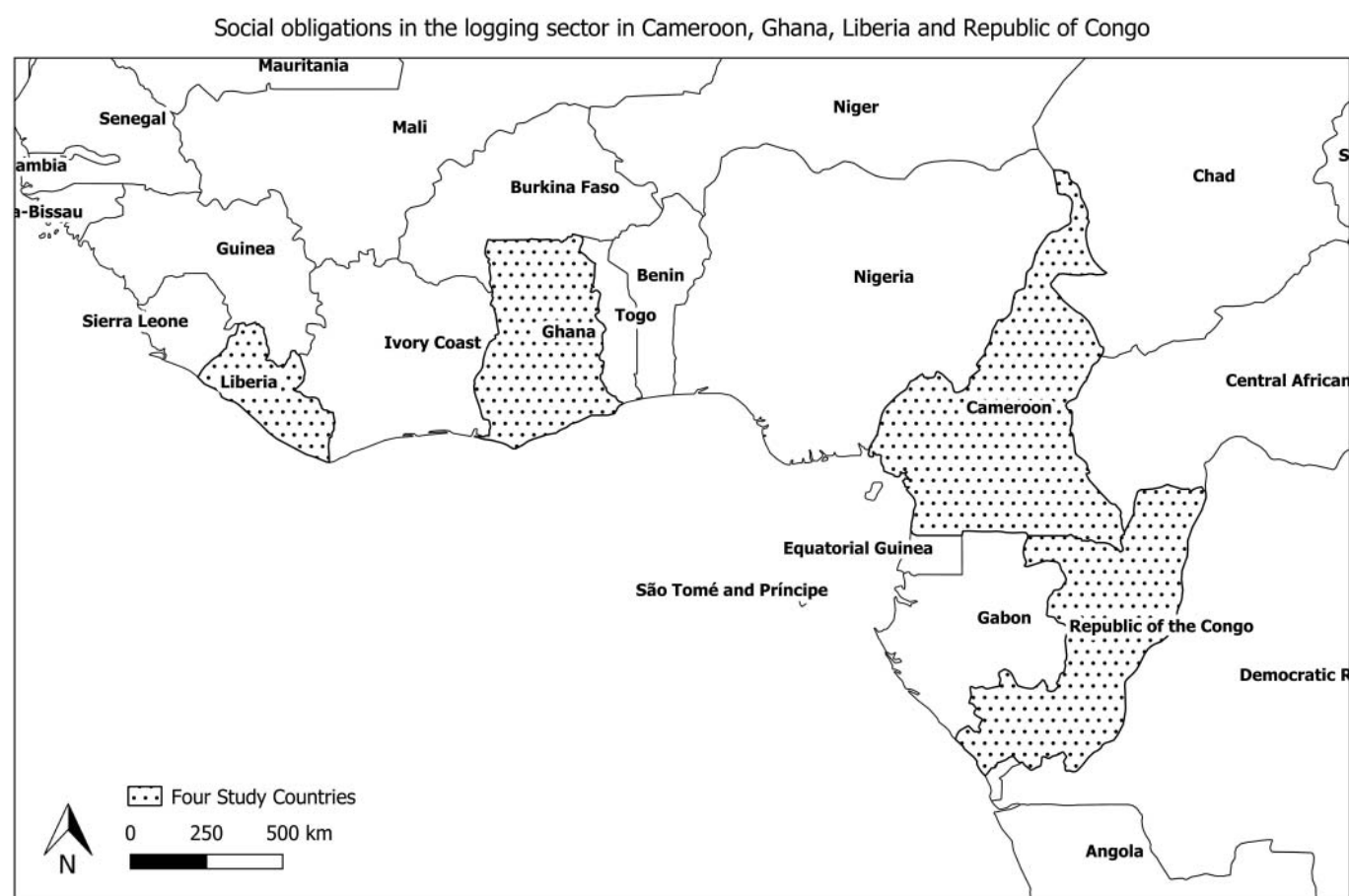
not extend the concept of social obligations to issues such as labour rights, or health and safety in the workplace, although for some countries these issues are described in the same legal frameworks.

Work on social obligations has been seen in other parts of the world as a vehicle to push for more dialogue, participation, transparency and ultimately for sustainable solutions to forest management, people’s rights and legal tenure reform (Liu and Innes 2015). Furthermore, the four countries studied have all signed a Voluntary Partnership Agreement (VPA) with the European Commission, under the Forest Law Enforcement, Governance and Trade (FLEGT) initiative. A major strength of each VPA is that it “*looks beyond trade to consider development and environmental issues, as well as how policies affect local populations*” (EU FLEGT Facility 2016), although there are concerns that VPAs emphasise legality, rather than social accountability.

FLEGT has rightly been commended for enhancing procedural rights, such as increasing participation and transparency (Fern 2016). This reflects wider concerns that the existing frameworks and practices are inadequate, insufficiently transparent or not being implemented. Thus this paper primarily seeks to document and analyse how social obligations systems are *meant* to work in each of the four countries, and to inform current forest policy review processes. This is complemented by evidence provided by literature, and from a leading non-governmental organisation (NGO) working in the forest sector of each country, highlighting key issues regarding implementation of the legal frameworks.

METHODS

This study contributes to the scientific and policy debate on the social impacts of logging by documenting and analysing how the social obligations that logging companies have vis-à-vis local communities are accounted for in legal texts. This approach is different from and complementary to field-based approaches, which investigate the actual impacts of logging on natural, human, and social capitals, such as those by Defo (2020) and Cerutti *et al.* (2014). While field-based studies take the empirical reality as basis for analysis, and then relate

MAP 1 *The four countries included in the study: Cameroon, Ghana, Liberia and Republic of Congo*

this back to legal and policy frameworks, here those frameworks themselves, and cross-country comparison between them are the focus of analysis. This allows for new insights into the merits and limitations of the current legal frameworks on social obligations while also offering a useful, and thus far missing, legal basis for those studying the social impacts of logging to contextualise their empirical findings.

The study was a detailed desk-based analysis of all the laws, regulations and other guidance in each country as it pertains to the identified social obligations, following an exhaustive search for them from government websites, international online libraries (Food and Agriculture Organization of the United Nations 2021, ClientEarth 2021), local contacts and the authors' own experiences. This was cross-checked in two ways. First, a literature review to ascertain what similar studies already existed was undertaken. Second, the research closely involved a leading NGO working in the forest sector of each country, in particular to provide testimony on the effective implementation of each type of obligation.

The research was primarily conducted in 2016, and a detailed country-by-country presentation was published the following year (Young 2017). The information was updated in 2019 for this paper through the review of any new legal texts that had been produced in the intervening period. This – shorter – paper also emphasises the differences between the four legislative jurisdictions in greater detail. In addition,

the new Forest Code in the RoC, promulgated in July 2020 (GoRoC), was reviewed for consistency with the previous draft text (MEF 2018).

All financial data are shown in the original currency and converted to US\$ at the exchange rates applicable at the time. This means that in some instances conversion of the same original figure at different periods produces slightly different US\$ equivalents. All figures are rounded.

RESULTS AND DISCUSSION

Social Obligations

The key social obligations identified in each country are summarised in Table 1. In all countries the obligations include direct arrangements between logging companies and the communities affected, via the redistribution of volume-based or area taxes, fees, and bid premiums that are initially collected by the State, or as a result of compensation or legal recourse where communities or individuals affected by logging operations have grievances.

The precise mechanism for the fulfilment of social obligations depends on a number of factors. First, the type and size of forest management or logging permit in place. Liberia, for example, has four permit-types: a long-term concession

TABLE 1 Summary of social obligations in four countries (see subsequent tables for sources)

	Cameroon	Ghana	Liberia	RoC
Area-based payments	A percentage of the area-based Annual Forestry Royalty (<i>redevance forestière annuelle</i> , RFA), to communities.	A proportion of the Annual Rent, to local government and traditional authorities.	A proportion of Area Fees and Contract Administration Fees, to Districts and communities.	A proportion of forest area tax (<i>taxe de superficie</i>), to <i>départements</i> . Where forest is cleared for other development, a proportion of the deforestation tax (<i>taxe de déboisement</i>), to municipalities.
Volume-based payments	No stumpage (<i>taxe d'abatage</i>) is redistributed to local communities. Some other volume-based payments are for the benefit of communities.	A proportion of stumpage, to local government and traditional authorities.	A Cubic Metre Fee, negotiated in the Social Agreement, paid directly to the affected community.	No stumpage (<i>taxe d'abatage</i>) is redistributed to local communities..
Contributions in kind	The Social Clauses of the Terms and Conditions (<i>clauses sociales des cahiers de charges</i>) of those logging permits that require them, agreed at an information meeting signed by local forest authority and government representatives, for the provision of social infrastructure by the company.	Social Responsibility Agreements (SRAs), negotiated between each affected community and the logging company, for the provision of social infrastructure by the company.	In State forests, Social Agreements, negotiated between each affected community and the logging company, for the provision of social infrastructure by the company. In community forests, a similar process, to agree a Commercial Use Contract* between the community and the logging company.	The Specific Terms and Conditions (<i>cahier des charges particuliers</i>) of each concession contract, agreed between the logging company and the State. The new 2020 Forest Code provides in addition for the participation of local authorities, local communities / Indigenous People, and NGOs (GoRoC 2020).
Legal recourse	Compensation for damage to private or communal property; a complaints management system to be established under the VPA; and the public duty to exercise civil enforcement.	Compensation payable by logging companies if they damage crops or property; dispute resolution mechanisms; and civil enforcement where authorities can take action stemming from reports by citizens.	Compensation payable where damage to private property (including crops) occurs; and a dispute resolution mechanism included in each Social Agreement.	Compensation payable in the event of the destruction of fruit trees and damage to crops.

* Commercial Use Contracts are due to be introduced. To date, ad hoc agreements, known as Memoranda, Third Party Agreements, or Social Agreements have served this purpose.

agreement, a short-term timber sales contract, a permit for communities wishing to manage their own forest, and a permit for private forests. Ghana has six: a large- and small-scale contract, three types of salvage permit, and a permit for the non-commercial harvesting of timber for local purposes. Cameroon recognises 15 types of permit spread across five forest categories: State, municipal, communal, community and private forests. Of these the dominant long-term concession is a harvesting contract in a Forest Management Unit (FMU). The RoC provides four permit-types: two variants of concession in FMUs (one similar to a timber sales contract with a proviso committing the holder to also provide timber processing facilities, the other also requiring reforestation), a permit for cutting plantation-grown timber, and special permits for non-timber forest products. The new 2020 Forest Code also provides for community forest management permits (GoRoC 2020).

Second, in all four countries, many social obligations are expected to be negotiated and fulfilled through some form of social agreement, ostensibly between the logging company and affected communities. In Cameroon and the RoC, agreements are referred to as *clauses sociales des cahiers de charges*, or ‘social clauses in the terms and conditions’ of a logging permit. In Cameroon this is a single set of terms and conditions, comprising general and particular clauses, and in the RoC there are two sets of terms and conditions, general and particular, social ones. In Ghana they are called Social Responsibility Agreements (SRAs), while in Liberia they are Social Agreements. In each country the larger logging contracts are between a company and the State, and thus a social agreement is in recognition of local communities as a relevant stakeholder. In Liberia, however, community forestry has recently been seen as the main way forward for forest management and there are over 120 Community Forestry Management Agreement applications pending approval (EU and GoL 2016). Under these, the company-community agreement is the logging contract itself, to be negotiated only after the community has obtained its forest management permit (FDA 2017, GoL 2009a). Social agreement oversight might be by a multi-stakeholder committee, solely by elected community representatives, or have no community involvement at all.

Third, the channels of payment vary between countries and with permit-type. For example, the redistribution of taxes, fees etc. that are collected centrally and should in part be for the benefit of local recipients may depend on intermediaries such as local government authorities or require a community to apply for funds with a proposal as to their purpose. Similar types of payments may in one country be collected and redistributed by a central authority whilst in others depend on direct payment to the affected community. The scope of the social agreement may only cover contributions in kind or may also stipulate the rate for cash payments.

Fourth, the wider context of policy reform in the forest sector and beyond has a bearing on the complexity and detail in the rules governing social obligations. In Liberia, for example, all logging concessions were abolished in 2005, in response to the imposition of UN sanctions on the timber

sector following evidence that the logging was fuelling Liberia’s conflict (GoL 2006a). Subsequently an entirely new forest sector legislative framework was devised. None of the other countries has experienced the same wholesale change, and reform is more often through secondary, incremental legislation. Liberia is also one of only a handful of African countries to have a Freedom of Information Act (UNESCO 2017) and the timber sector is included in Liberia’s Extractive Industries Transparency Initiative, requiring it to make concession contracts publicly available (GoL 2009b).

These variants all have implications for the design of social obligations, in particular their complexity, the check-and-balances in place to control them, the risk of inefficiencies and the opportunities for misappropriation. The rest of this section discusses these.

Area-based payments

The mechanisms for collecting and redistributing area-based payments in each country are summarised in Table 2. In Cameroon, the distribution formula for RFA is set in the annual finance law, inferring that it can be adjusted regularly. A 10% share for communities was dropped in the 2015 finance law, and only after active lobbying from local NGOs was it reinstated in 2017, with 6.75% being allocated to development projects run by local communities (GoC 2016b).

In Ghana, Annual Rent is a fixed amount, quoted in cedis; GH¢ 0.10–0.12 (US\$ 0.025–0.03) depending on location (MLF 1998), so it is difficult to update it to compensate for cedi depreciation or land value appreciation without revising an entire regulation.

In Liberia, the first introduction of a legal stipulation that a proportion of revenues was to be given back to affected communities was in 2006 (GoL 2006b). However, in the first eight years of logging, no money earmarked for communities was paid into the National Benefit Sharing Trust Fund, despite the obligation to make quarterly payments (FDA 2007b). After intensive advocacy by local NGOs and communities, on 17 July 2015 the first US\$ 1 million was paid by the government into the Fund, and a further US\$ 250,000 was deposited in 2016. Subsequently the modalities for communities to apply for funds, and the supervision of the Fund by a National Benefit Sharing Trust Board have been developed. By late 2016 some US\$ 700,000 had been redistributed to communities for projects (NBSTB 2017).

In the RoC the 2000 Forest Code provided that 50% of the area tax in each FMU should be allocated to a Development Fund for Congo’s *départements* (GoRoC 2000), but this has never happened because a later decree transferred the revenue stream to a Road Fund (Ministry of Public Works *et al.* 2004). Hence, there is a perception that this area tax is not a ‘social obligation’. Furthermore, there has never been any provision for the redistribution of this tax to local communities. The new Forest Code States that the scope, rate, recovery mechanism and distribution arrangements of all taxes are to be set in the annual finance law (GoRoC 2020). In addition, all activities that lead to the destruction of natural forest were subject to a forest clearing tax (*taxe de déboisement*) (GoRoC 2000).

TABLE 2 *Legal provisions regarding area-based payments in four countries*

	Cameroon	Ghana	Liberia	RoC
How is the money raised?	RFA is a combination of a flat-rate area tax and the price offered by the winning concessionaire in the bidding process (GoC 2016b). The flat-rate is between 1,000 and 2,500 CFA Francs (US\$ 1.8–4.6) per hectare per year, depending on the permit-type (GoC 2014). The RFA averages 2,800–17,600 CFA Francs (US\$ 4.6–29) per hectare, depending on the permit-type (MINFOF 2015). It is payable to the State.	Annual Rent between GH¢ 0.12 and GH¢ 0.1 (US\$ 0.03–0.025) per hectare per year, depending on the permit-type (MLF 1998).* It is payable to the Administrator of Stool Lands (MLF 1998), as one of a number of rents and royalties payable to landowners (Ghana Land Administration Project 2017).	Area Fee of US\$ 1.25 or US\$ 2.50 per hectare per year, depending on the permit-type and contract area (FDA 2007c, GoL 2009a). Contract Administration Fee, US\$ 1,000 per contract per year (FDA 2007c). Bid Premium, the price offered by the winning concessionaire in the bidding process, was applicable between 2008 and 2012 (GoL 2013). All are payable to the State.	Area tax of 250, 350 or 500 CFA Francs (US\$ 0.4, 0.6, 0.8), depending on the region in the country, is levied on each FMU (GoRoC 2000, MEF 2002). In addition, the price offered by the winning concessionaire in the bidding process (GoRoC 2009). A forest clearing tax applies to the conversion of forest to other land use (GoRoC 2000). All are payable to the forest ministry (GoRoC 2000).
How is it redistributed?	The redistribution formula for the RFA is stipulated in the annual finance law so may change each year. The law currently applicable indicates (GoC 2016b): • 55% is retained by the State, 5% for “assessment and collection costs for the administrations concerned” (MINFI 2015). • 20.25% is redistributed to the municipality in which the logging takes place. • 18% is redistributed between different municipalities to ‘equalise’ their resources. • 6.75% is redistributed to the relevant municipality, to “be allocated exclusively to development projects run by local populations.”	As a royalty, annual rent is subject to a redistribution formula enshrined in Ghana’s Constitution, which in effect is (FC and OASL 2007, FC and OASL 2010–11, GoG 1992): • 10% is retained by the Office of the Administrator of Stool Lands (OASL, a government agency responsible for administering land revenue allocated to traditional leadership and land structures, or stools). • 22.5% is redistributed to the relevant Stool (local chieftaincy). • 18% is redistributed to the relevant Traditional Authority (chieftaincy group). • 49.5% is redistributed to the relevant District Assembly.	Forest sector legislation governs the redistribution: • In concessions on public land, 30% is to be transferred to a national trust fund, for onward distribution to affected communities (FDA 2007b). • 30% is to be divided equally between Liberia’s 15 counties, paid into each County Forestry Development Fund (FDA 2007b). • The remaining 40% (and the entire Bid Premium) is retained by the State (GoL 2006b). • In community forests, 55% is payable to the affected community, and 45% retained by the State (FDA 2017).	A government decree lays out the redistribution (GoRoC 2002b): • 50% is redistributed to all Congo’s <i>départements</i>, or local government authorities. • The remaining 50% is retained by the State.

* Rates were originally in Ghana old cedis; GH\$ 1,200–1,000. The cedi was redenominated in 2007, such that GH\$ 10,000 became GH¢ 1

The tax rate depended on the expected end goal of the investment: mining operations paid the maximum, 200,000 CFA Francs (US\$ 320) per ha, while traditional agricultural activities were expected to pay the least, 5,000 CFA Francs (US\$ 8) per ha. Two forest activities – campsites and roads – were each to be taxed 50,000 CFA Francs (US\$ 80) per ha. The new Forest Code introduces a related occupation tax (*taxe d'occupation*) paid to obtain authorisation to occupy the forest to be cleared (GoRoC 2020). Contrary to other area taxes in the RoC, the forest clearing tax is allocated to operating costs of the forest authority (MEF and MEFB 2002).

Rate Setting

Different legal bases for the tax rates have implications for their ability to keep in line with international prices. For example, Ghana has very low rates of area-based taxes because they are enshrined in a 1998 law. Since that time the cedi has depreciated by a factor of 200,000. In contrast, in Cameroon the forest taxes are reviewed annually in the national finance bill, providing an opportunity to maintain them in line with other values. This approach has the ability to influence on both the content and enforcement of social obligations, however the tendency in Cameroon has been to adjust the percentage share away from communities, causing much protest (Yamo 2015).

Competitive bidding

It is increasingly common for natural resource concessions to be awarded through a competitive process, and each of the four countries have – on paper – a process based on the price a company is prepared to offer to get the logging contract, in addition to the area-based tax. In Liberia and Ghana, however, these have recently been significantly discounted. It is important to recognise these not as taxes, but as an amount volunteered by the winning company in a bidding process. As such the rates are not imposed by the State, although subsequent collection of the bid amount is a legal obligation.

In Liberia, in the 17 large and small concessions issued since 2008, the Bid Premium has averaged US\$ 9.38 per hectare per year and should have generated almost US\$ 10.5 million per year – more than four times that from area fees. However, the bids were generally considered to be unrealistically high compared to the value of the timber and frequently not paid leading to arrears of US\$ 42 million by 2013 (CS-IFM and NGO Coalition 2014). The Bid Premium was in effect abolished in 2013, including the waiver of all future amounts due on the current contracts (GoL 2013), and without a promised equivalent basis for competitive bidding being in place.

Ghana has in 2017 similarly replaced an annual Timber Rights Fee with a single payment at the time of permit allocation (MLNR 2017). These changes represent losses to the State of millions of dollars over the years (Forest Watch Ghana 2004), and therefore increase pressure on the State to retain, rather than redistribute, other logging revenues.

Competitive bidding is important to the issue of revenue redistribution because it can affect the total amount available for redistribution. For example, when the Bid Premium did

exist in Liberia, there were intense disputes over whether or not it should be subject to redistribution. Similarly, the Forestry Commission in Ghana has been challenged on its retention of 50% of the revenue prior to redistribution, and the Government of Cameroon has been criticised for keeping 5% of the area-based tax to cover the administrative cost of the tax, when it is one of the cheapest taxes to collect. These have all reduced the proportion of revenues to be passed on to local recipients, including those whose livelihoods are most affected by large-scale logging concessions.

Volume-based payments

The mechanisms for collecting and redistributing volume-based payments in each country are summarised in Table 3. In Cameroon stumpage has historically been a small element of revenue redistribution compared to RFA and applied to the larger concessions. The 2016 finance law extended this tax to all types of permit, including communal and community forests (GoC 2015). The 2019 finance law then raised it from 2.5% to 4% of the international timber price (GoC 2018). Currently local communities do not receive any share of stumpage although between 1996 and 2001, 1,000 CFA Francs per m³ standing timber sales was paid to affected communities. On the contrary, stumpage from community forests, previously entirely available to communities, is now reduced by 4%. Municipalities should allocate 30% of their stumpage income to the development of infrastructure for local communities (MINFOF, MINATD, and MINFI 2012).

In Ghana, the redistribution of stumpage is the most significant mechanism for revenue-sharing with local recipients, although redistribution is to local institutions, not directly to communities. Redistribution is in line with the constitution (GoG 1992), so is much more difficult to revise compared to the other countries where it is stipulated in lower laws, regulations etc. Nonetheless, prior to redistribution the Forestry Commission retains 50% of stumpage (but not annual rent) as some form of management fee. Some argue that legally speaking the Commission should only retain one third of stumpage (ClientEarth 2013).

There is no redistribution of stumpage in Liberia, but an additional payment – the Cubic Metre Fee – is negotiated as part of each Social Agreement and should subsequently be made available by the logging company to the community on a quarterly basis. A 2015 study concluded that 65% of the Cubic Metre Fees due had not been received by the communities (CS-IFM and NGO Coalition 2015). There was also confusion over whether the fee was calculated on the basis of volume exported or on volume harvested, as is clearly stipulated in the regulations (FDA 2007a).

In the RoC, a new mechanism, *Fonds de développement local* (FDL) is being established. It originally came about in those concessions seeking forest certification (Schmitt and Baketiba 2015a), as a mechanism for local multi-stakeholder engagement in those parts of the concession with a community focus, and in particular as a scheme to finance community micro-projects. These logging companies have paid 200 CFA Francs (US\$ 0.4) per m³ into the respective FDL for each

TABLE 3 Legal provisions regarding volume-based payments in four countries

	Cameroon	Ghana	Liberia	RoC
How is the money raised?	<i>Taxe d'abatage</i> at 4% of the international timber price, depending on species (GoC 2018). Municipal Forests and Community Forests can set their own rate, if in line with relevant development plans (MINFOF, MINATD, and MINFI 2012). Salvage Licences levy up to 2,000 CFA Francs (US\$ 3.8) per m³ (MINFOF, MINATD, and MINFI 2012, GoC 2009). Between 1996 and 2001, for Sales of Standing Timber in Communal Forests 1,000 CFA Francs (US\$ 1.9) per m³, was to be paid to the affected community (GoC 1995, MINEF 1996).	Stumpage fee, based on 35% of the international timber price, and an adjustment “<i>determined by the Minister in consultation with the Commission and the Administrator of Stool Lands, having regard to the market demand and inventory levels of timber species</i>” (MLF 2003). It is collected by the Forestry Commission (FC and OASL 2007).	A Cubic Metre Fee is negotiated through the Social Agreement, but must be at least US\$ 1 per m³ harvested (FDA 2007a). It is to be paid quarterly into an escrow account held by the company on behalf of the community. Stumpage fees are 2.5–10% of the international timber price, varying by species scarcity class. They are payable to the State (FDA 2007c).	A flat-rate 200 CFA Francs (US\$ 0.4) per m³ of merchantable timber produced in a long-term forest management concession is to be paid to Local Development Funds (<i>Fonds de développement local, FDL</i>) for each community (Schmitt and Baketiba 2015a).
How is it redistributed?	Local communities do not receive any share of <i>taxe d'abatage</i>. Municipal Forests and Salvage Licences: 30% for affected communities, and 70% for the entire municipality (MINFOF, MINATD, and MINFI 2012). Community Forests: entire income is for the benefit of the community (MINFOF, MINATD, and MINFI 2012). Sales of Standing Timber in Communal Forests: payment terms to be included in the Social Clauses (GoC 1995).	As a royalty, stumpage is subject to a redistribution formula modified from Ghana's Constitution, which in effect is (GoG 1992): • 50% is retained by the Forestry Commission • 5% is retained by the OASL. • 11.25% is redistributed to the relevant Stool. • 9% is redistributed to the relevant Traditional Authority. • 24.75% is redistributed to the relevant District Assembly.	For Cubic Metre Fees the respective, elected, Community Forestry Development Committee (CFDC) must request in writing to the logging company to make payments to the community's bank account. The forest authority must authorise these transactions. 10% of the Stumpage Fee is to be redistributed to Protected Forest Areas Network, with the remainder retained by the State (GoL 2006b).	The <i>FDL</i> for each applicable concession is formalised through a pair of ministerial orders describing its oversight structure, and organisation and functioning, respectively (Schmitt and Baketiba 2015a).

concession (Schmitt and Baketiba 2015a). Although there was no reference at all of FDL in the 2000 Forest Code, by 2015 it was increasingly regarded as mandatory (Schmitt and Baketiba 2015b), and the 2020 Code States that fees and taxes allocated to local communities and Indigenous populations will be deposited in their FDL. In addition to FDL, communities have been known to receive cash from companies through, for example, the sale of timber from those parts of the concession with a community focus. Such transactions are purely bilateral and vary from one company to another (Waouo *et al.* 2016).

Rate setting

Volume-based tax rates are typically based on international timber prices so should be regularly revised in line with these and with global currencies. If this does not happen, opportunities for rent-seeking open up, as the taxes that a logging company has to pay may drop dramatically in global trading terms. In Ghana, contrary to a requirement that stumpage fee rates are revised quarterly, they have been revised only once since 2003 (FC 2014). A study of the impact of the failure to keep stumpage rates up to date for more than a decade estimated the loss to be “*approximately US\$ 16 million, equivalent to four times the potential contribution of the timber industry to forest communities’ welfare under SRAs*” (Birikorang 2015). As in Ghana, stumpage tax rates in Liberia have not been revised as required by law (FDA 2007c). These are examples of State-capture corruption, whereby savings from underpaid tax are potentially used to influence policy-makers to maintain this advantageous situation (Goncalves *et al.* 2012).

Failure to make such adjustments can be regarded as an implicit subsidy to the logging industry, as any increase in broader land values or timber scarcity is not reflected in the price that a logging company has to pay to extract the timber. For example, not adjusting the tax in Ghana provided a subsidy to the logging companies estimated to be US\$ 8 per m³. During the same time, the total income by local government and traditional leaders was just US\$ 2 per m³, suggesting that if companies were paying taxes in line with international timber prices then local recipients could be receiving up to five times their current income (EcoEcon 2015).

Volume-based versus area-based levies

Comparing countries, the choice of area- or volume-based taxes as the primary source of redistributed revenue is pertinent as the former is a relatively fixed, regular and known amount, whereas the latter varies with the production level of timber.

In Ghana, volume-based taxes are the primary source of funds to be redistributed, whereas area-based taxes are the primary source in Cameroon and the RoC. Liberia provides significant redistribution from both sources, although volume-based payments are made directly by the company to the community, not through the State tax system. The FDL in Congo is a similar system as in Liberia, as it channels an agreed volume-based payment from the company to a community fund.

Fund management

In Cameroon, while municipal oversight committees officially include elected village representatives, field research suggests that the mayor often has excessive influence in the designation of those village representatives. This, combined with poor transparency on the amount allocated to communities hampers any strong demand for accountability, and cases of fraud by municipal authorities have been investigated (Yamo 2015).

In Liberia revenues are redistributed to community groups elected to represent the wider community for this specific purpose. In Cameroon, Ghana and for area-based tax in the RoC it is to local government or traditional leader institutions, and not to communities directly. For volume-based revenues in the RoC, the FDL has a representative from each of the surrounding communities amongst the members on the committee controlling the fund. The other members represent various local government bodies, local NGOs, the logging company, and experts. However, the legal framework is still incomplete on FDL, and the only legal provision regarding its establishment is described in the guidelines for the development of forest management plans. Aside from those guidelines, each FDL is established by a ministerial order. Unfortunately, such an order only covers managed concessions, which is worrying as only about half the concessions have a management plan in Congo (EU and GoRoC 2015).

Contributions in kind

The social agreements and associated modalities for contributions in kind by the logging company to affected communities vary between countries, as summarised in Table 4. In all cases these agreements constitute a legal requirement. In Cameroon, Ghana and the RoC, they should be agreed prior to the finalisation of the logging contract. In concessions in Liberia, the legal framework is clear that they must be signed as part of the preparatory steps a company takes after being awarded the contract and before any logging takes place (FDA 2007a). In Liberia’s community forests, they are contained in the Commercial Use Contract that a community and company can negotiate after the community has received its forest management permit.

Contributions in kind typically include roads, bridges, clinics, schools, mills for agricultural produce, water and electricity supply, sports or cultural facilities. They may also support activities such as reforestation projects, income-generation initiatives or innovation and technological improvements.

The parties to the social agreement differ between countries. In Cameroon they are negotiated between the State and the company, with communities’ involvement granted through an information meeting, the minutes of which are an integral part of the contract terms and conditions (MINEF 1998a). A similar situation existed in the RoC where the legal framework did not provide for representation of local communities and Indigenous Peoples in the negotiation of social clauses, so drafting has been carried out by the logging company and the State (Barros 2014). The 2020 Forest Code, however, provides for the social clauses to be negotiated with representatives

TABLE 4 Legal provisions regarding contributions in kind in four countries

	Cameroon	Ghana	Liberia	RoC
How are contributions in kind determined?	The Terms and Conditions in most types of logging permit are to include 'general clauses' relating to technical aspects of logging, and 'special clauses', covering financial obligations, processing facilities, and social infrastructure (Social Clauses, GoC 1994). These Social Clauses are to be documented in the minutes of 'information meetings' between the communities and the logging operator, and signed by "all the stakeholders" (EU and GoC 2009), although typically signed by the forest authority and the Prefect in that locality.	A SRA is to be agreed between the logging company and local communities (MLF 2003). It has two parts (FC 2013b): • A Code of Conduct, listing the rights and interests of communities that must be respected by the company. • Social Obligations, a list of materials and services the company agrees to provide, equal in value to 5% of the stumpage fees a company pays (MLF 2003).	Social Agreements are negotiated between the community and the logging company, and attested by the forest authority (FDA 2007a). The template indicates they should contain: a code of conduct for community members and logging company personnel; the Cubic Metre Fee rate; a dispute resolution mechanism; and any other locally relevant terms (FDA 2014). In community forests, a similar process exists to agree a Commercial Use Contract between the community and the logging company (FDA 2017).	Specific Terms and Conditions (<i>cahier des charges particuliers</i>) form part of each concession contract (GoRoC 2000). They are negotiated amongst all parties (GoRoC 2020), and might include housing, clinics, schools, water and electricity supply, sports and leisure facilities, and "popularisation of new technologies to promote a sedentary agriculture and improve the productivity of agro-pastoral farms, input supply and the establishment of funds suited to different activities" (GoRoC 2002a).
How are contributions in kind fulfilled?	Community infrastructure provided for in the Social Clauses is normally built by the logging company but the legal provisions also allow for financial contributions to be given to communities who then do the construction work (GoC 1994). Roads, bridges, clinics and medicines, schools, water supply, electricity supply, sports or cultural facilities, reforestation projects are all possible investments (GoC 1994). Some build the social infrastructure themselves while others provide communities, through the Municipality, with the money to do the work (FODER 2016).	Community infrastructure provided for in an SRA is normally built by the logging company. In some cases, the company deposits money into a community fund (Civic Response 2016). They typically include schools, clinics, water and electricity supply, or construction of palaces for traditional rulers and of community centres (Ayine 2008). District Forest Offices have a facilitatory role in negotiating SRAs including determination of the 5% stumpage value. They then have a duty to ensure compliance, including the application of sanctions (FC 2013c).	The Social Agreement and Commercial Use Contract templates make it clear that the company and community should both describe how they will abide by terms and conditions of the agreement. They also require the logging company, community, and forest authority to meet at various frequencies to address any grievances. They are to be reviewed / renegotiated every 3–5 years term depending on the type of logging permit (FDA 2007a, FDA 2014, Heritage Partners Associates and ClientEarth 2019). Typical investments include roads, clinics, schools, community guest houses and mills (NUCFDC 2016).	Generally the logging company finances and supervises the construction process, rather than handing responsibility and funds to local government or communities to do so. The forest authority at <i>département</i> level is responsible for reporting to the central ministry progress in the implementation of <i>cahier des charges particuliers</i> every quarter (GoRoC 2002a).

from local communities and Indigenous Peoples. In Ghana, SRAs are explicitly for the benefit of local communities, sitting alongside the redistribution of stumpage which is to traditional authorities and the local government. They must amount to 5% of the stumpage value, are negotiated between the logging company and affected communities, and witnessed by the Forestry Commission, traditional authorities, and local government representatives. In Liberia, Social Agreements are similarly negotiated between the company and community representatives. Unlike the other countries, these representatives are democratically elected and form a legally recognised committee with its own bylaws and bank account. As well as contributions in kind, the Cubic Metre Fee is agreed in the Social Agreement.

Negotiation and implementation of social agreements

No country currently has sufficient guidance on social agreements that covers all aspects of community representation, negotiations, compliance monitoring and dispute resolution (Young 2017). Typically, in every country those involved in social agreements, from a community, logging company, or forest authority perspective, need to refer to multiple legal and procedural texts in order to fully appreciate the roles and responsibilities of the different parties.

In Liberia, following concerns about the process of negotiating Social Agreements, and the content of the final document (CS-IFM 2015), a Social Agreement template was developed in 2014. Whilst the template and guidelines have no legal force in themselves, once each agreement has been negotiated and signed, it becomes binding on the logging company and community – and on the forest authority to the extent that the authority must formally attest to the agreement (FDA 2014).

In Cameroon, community members have a limited role in negotiating the social agreements, reducing the influence that they subsequently have in the implementation and compliance monitoring. In the RoC, guidance and a wider multi-stakeholder oversight group were piloted in the FDL system. The 2020 Forest Code built on this and States the social clauses should be “*negotiated between the forest administration, the concessionaire, the representatives of the local communities, the Indigenous populations concerned and civil society organisations*”, are signed by each party, and then “*made available to the public in each locality concerned... within 30 days*” (GoRoC 2020). Although there is an expectation in Congo’s current legal framework that the management plan must include the establishment of a Management Committee – comprising members of the local population and non-governmental organisations alongside the administration, operator and donors (MEF 2007) – the modalities for doing so are not yet specified.

In Ghana there is no consolidated guide on how the community should be represented in SRA negotiations. Civil society has long advocated for access to information about the species-volume total for timber being removed, so that independent assessments can be made of whether they amount to 5% of the value of stumpage.

Only in Liberia is the social agreement system prefaced by local elections for community representatives, with the specific inclusion of women, in a process that is clearly laid out in the legal framework (FDA 2007a). These representative committees are then responsible for managing the funds received by the community as well as for monitoring fulfilment of other aspects of the Social Agreements. In RoC there are also examples of women’s inclusion being mentioned in ministerial orders to establish the committee that manages an FDL.

Even in Liberia, at present negotiations are unbalanced and badly recorded. Furthermore, the regular renegotiation of social clauses tends in reality to be optional, not a legal requirement, despite the fact that in the course of a decades-long concession, which moves across a large geographical area, it would be appropriate to renew the agreements from time to time.

To date there is no system for monitoring the fulfilment of infrastructure or other contributions in kind, and there are no good data available on the delivery of community infrastructure. Lack of transparency is a major obstacle to the implementation of social agreements, as the agreements themselves are not easily accessible by those who would want to use them to assert their rights. Although the legal frameworks are clear that agreements must be in place, in practice they are not systematically attached to the logging contracts. In addition, contracts are not readily publicly available, making it difficult to know what commitments to social infrastructure may have been made, let alone fulfilled. A study in eight communities neighbouring forest concessions in Cameroon revealed none had ever received copies of their Social Clauses (CED 2013). In Ghana, no good data on how many SRAs exists, despite the fact that by law at least one SRA must be negotiated for each of the 327 long-term logging permits to be legal (FC 2013e).

As a consequence, there are wide variations in the fulfilment of contributions in kind between concessions, but overall, as observed in the RoC, there is “*no governance structure to monitor performance*” of social agreements, leading to low levels of achievement (Schmitt and Baketiba 2015a). The 2020 Forest Code in the RoC has made some attempt to improve compliance, stating the penalty for not meeting the social clauses “*will be punished with a fine corresponding to 100% of the value of the obligation not performed*” (GoRoC 2020). Offenders may also have their permit revoked and be banned from future logging permits, but detailed modalities for implementing any of this are yet to be drafted.

Legal recourse

A crucial element in ensuring social obligations are met is an effective mechanism to obtain recourse if any party feels aggrieved. The mechanisms for legal recourse for communities or individuals affected by logging operations in each country are summarised in Table 5. Recourse might be through direct compensation, dispute resolution, and/or civil enforcement.

Regarding the first of these, in Ghana, compensation for damage to crops – cocoa farms in particular – is recognised and one study reported payments of GH¢ 2–30 (US\$ 0.5–8)

TABLE 5 *Legal provisions regarding legal recourse in four countries*

	Cameroon	Ghana	Liberia	RoC
What mechanisms for legal recourse exist?	The forest law warrants compensation to those who lose their forest to a concessionaire (GoC 1994). The Penal Code provides a general clause for damages arising from any offence to be paid (GoC 2016a). Environment law recognises the right for local communities to sue for damages. (GoC 1996). Guidelines State “officials must, upon request, assist the holder of a logging title to reach an equitable settlement of its differences with neighbouring populations” (MINEF 1998b). Citizens have a duty of civil action, to report infractions to the authorities (GoC 2005).	Compensation for damage to crops must be laid out in the terms and conditions of the logging contract (GoG 1998). The compensation rate should be one of the clauses in the SRA (FC 2013d). A possibility for citizen’s suits and civil enforcement is provided in the Sample SRA: “if the company fails to comply with the above responsibilities as agreed within the period... of contract, the community shall be compelled to inform the Forestry Commission to take immediate action or institute sanctions specified in the Timber Resources Management Act” (RMSC 2004).	Compensation for damage to the private property of a land owner is to be resolved through informal negotiation, arbitration by forest authority, or, ultimately, the courts (FDA 2007d). Social Agreements have a dispute resolution mechanism, including the use of a neutral third party, local leaders, or the courts (FDA 2007a, FDA 2014). The potential for citizen’s suits and civil enforcement includes: harm by violation of a law; harm by violation of a logging permit; compulsion to comply, and harm from non-compliance, with the law; and compulsion to collect taxes (GoL 2006b).	There is no direct reference to compensation in the Forest Code but a decree predating this, and administered by the ministry of rural development, is referenced in the VPA, applicable to the main logging permits (EU and GoRoC 2011, GoRoC 1986). Compensation is payable for the destruction of fruit trees and damage caused to agricultural crops (GoRoC 1986).
How are channels for legal recourse fulfilled?	The decree required to implement the commitment in the forest law to compensation has never been promulgated. There is no discernible system for implementing these stipulations, nor any evidence available that they have been used.	The forest authority has a duty to conduct damage assessments and to ensure compensation is paid, and timber should not be removed from the forest until any compensation due has been paid (EU and GoG 2009). Recommended indicators of achievement of a forest reserve management plan include “the number of disputes between the Forest Service and the communities and any contractors [has] been kept to an acceptable level and [is] showing no annual increase” (FC 2013a).	There is no discernible system for monitoring the implementation of these stipulations, nor any evidence available that they have been used.	Compensation is paid directly by the perpetrator to the damaged party (GoRoC 1986).

per cocoa tree destroyed (Sustainable Forest Management Partnership – Ghana 2016). The issue of compensation drives a debate around the ownership of timber trees on farms, as it does not make sense to farmers in important cocoa-growing areas to nurture young timber trees if they cannot be sure of receiving fair compensation if their cocoa farms are damaged when the State permits a logging company to fell these trees.

In Liberia and the RoC compensation is also potentially available for damage to crops, but, as is the case for agricultural, land and environmental laws in Cameroon (GoC 1996) that also have provisions for compensation, either the rates are obsolete and unfair to communities, or the processes to access them are cumbersome. In the RoC for example, this is based on a decree (GoRoC 1986) that predates the forest law and has been rendered valueless by the sharp devaluation of the CFA Franc in 1994. In Liberia, landowners are eligible for compensation for damage to property (FDA 2007d) but the term ‘landowner’ is not defined so it is unclear if customary or collective owners, or farm tenants, are eligible.

With respect to dispute resolution, only Ghana and Liberia have any procedures in place. In Liberia these stem from the regulation governing Social Agreement negotiations and offer a progression from use of a neutral third party, then a local leader (District Commissioner, Paramount Chief, Clan Chief, or Town Chief), or, if this fails, commercial arbitration rules apply and the case may be taken to court (FDA 2007a, FDA 2014). In Ghana, the Forest Services Division – the front-line field offices of the forest authority – are the first point for dispute resolution, with a complaint mechanism to address disputes arising from compensation, SRAs and other community concerns. This mechanism is not well documented but is “*not immediately concerned with the issuance of timber legality licences*” (EU and GoG 2018). The RoC lacks any legal provisions on conflict resolution in the forest sector, but there is evidence of communities calling on companies to mediate and settle their internal conflicts (Schmitt and Baketiba 2015a).

Civil enforcement – the potential for citizens to take legal action for harm as a result of the misapplication of a law, or to compel the correct application of the law – is very clear in Liberia’s forest law, covering five areas (GoL 2006b).

In Cameroon, the penal code encourages, and even demands, citizens to alert authorities to infringements of the law (GoC 2016a), but this appears to be more about protecting the State against rogue individuals or companies than asserting community rights or benefits. In Ghana and the RoC, beyond the expected right of the forest authority to sanction a logging company for non-payment of taxes, fees etc., including in the event of a citizen reporting non-compliance, forest sector legislation does not make provision for civil enforcement.

Access to justice

Whilst all social agreements are legally binding, it is only where the social agreement is signed by community and company representatives that either of these parties have legal standing. Thus, in the case of Cameroon, where social agreements are not signed by community representatives,

it may be more difficult for these citizens to seek redress for non-compliance by the (more powerful) companies.

In recognition that in practice there is little indication of who is responsible for compensation, and how claims should be handled, dispute resolution mechanisms are under development in all four countries, as part of the FLEGT initiative (see next section). They risk, however, being too narrowly framed, for example two mechanisms recently developed in Ghana “*cannot accommodate... complaints such as concerns from affected communities, farmers or other stakeholders*” (EU and GoG 2018). On the other hand, dispute resolution mechanisms that are specifically designed to support social agreements may not be sufficient to cover any redistribution of taxes and fees, or compensation claims, that fall outside the remit of the social agreement.

The issues of compensation for damage to crops in the process of accessing timber trees is of greatest importance to Ghana, then RoC, with little attention paid to this in Liberia or Cameroon. This may reflect individual national circumstances, where for example in Ghana but not in Liberia significant timber is sourced from farmland. However, the risk of damage to crops and other property may in future increase in all countries for two reasons. First, the increasing scale of agricultural concessions combined with these plantation investors’ commitments to zero net deforestation will heighten the possibility of logging and land use conversion in degraded or mixed forest, and in farm areas. Second, any move to increase logging operations in community forests is more likely to involve logging machinery and farmers’ fields in close proximity.

FLEGT and the delivery of social obligations

As indicated above, all four countries have signed a Voluntary Partnership Agreement (VPA) with the EU, under the Forest Law Enforcement, Governance and Trade (FLEGT) initiative. These VPAs State that logging companies must comply with their social obligations if their timber is to be deemed legal. This has triggered new initiatives in Liberia, Ghana and the RoC to improve guidance and compliance. In the RoC for example, the existence of FDL is a criterion in the definition of legal timber, and the revised Forest Code, triggered by the VPA, has for the first time made mention of the FDL (GoRoC 2020). In Ghana, the VPA has precipitated progress in two long-overdue and contentious issues: new regulations to clarify the Timber Rights Fee (MLNR 2017) and a review of stumpage rates (FC 2014). Payment of compensation is included as a legality verifier in the Ghana and RoC VPAs, but not mentioned at all in those of Liberia or Cameroon. Land tenure and free prior informed consent mechanisms have also been strengthened, in Ghana for example definition of legal timber ensures that for logging in farmland (outside forest reserves), a prerequisite to any community consent to allow logging is that any land tenure disputes are resolved by arbitration, and that the process is documented (EU and GoC 2009). In each country there has been greater recognition of multi-stakeholder inclusion in decision-making, and of transparency in revenue collection and management, rendering

the fulfilment of social obligations more likely. Given the enhanced legal recognition of the duty to fulfil social obligations, citizens now have a clearer potential to challenge either a logging company for breach of contract on the grounds of non-fulfilment of a social agreement, or the State for failure to enforce the law.

This is not to say that formal legal avenues should be the first choice for recourse, and the VPAs are proving instrumental in improving a series of sector-specific dispute resolution mechanisms. For each VPA an Independent Auditor must set up a system for receiving and dealing with complaints. The Liberia VPA legality assurance system has explicitly replicated this system – and the criteria for assessing its effectiveness – to cover complaints about the verification and FLEGT licensing functions as well as the Independent Auditor (EU and GoL 2012). In Cameroon the verification body must *“have a fully documented management system that... uses a publicly accessible complaints management system”* (EU and GoC 2009). The four dispute resolution mechanisms being developed in Ghana suggest that this approach of multiple dispute resolution mechanisms for different VPA bodies and forest institutions is being replicated there too. Cameroon and Liberia have committed to making documentation on some complaints and their outcomes available to the public.

It remains to be seen how these dispute resolution mechanisms will be implemented in practice and is as yet unclear how they will provide recourse for citizens with grievances relating to their rights or benefits. To the extent that draft verification protocols for each VPA are available, however, many of these seem to stop at the establishment of dispute resolution mechanisms, and do not extend to whether they function, with transparency and accountability, or to how disputes have actually been resolved. Consequently, the onus will more than likely be on communities and civil society more broadly to improve documentation and presentation of complaints and keep written records of engagement with forestry or other officials.

Similarly, regarding contributions in kind there is emphasis in the VPA legality criteria on the existence of social agreements as distinct from their implementation. The VPA definitions of legal timber, whilst aligned with most laws, do not go further, and no clear provision exists on the monitoring and sanctions in case of non-delivery of contributions in kind. This is remarkable as NGOs, and even communities in Liberia, were part of the process to agree on what is legal timber.

Overall, the VPA legality grids fail to cover compliance with any code of conduct (laying out the rights and responsibilities of logging companies and affected communities), the outcome of disputes, where and when contributions in kind should be delivered, to what standard or size, or who is responsible for ensuring quality. This leaves the top-level commitment open to wide interpretation as to what ‘compliance’ means. Most of these mechanisms exist in draft form so to date there is no experience of their practical operation. Whilst the verification protocols for each VPA legality grid may go some way to rectify this, they are less public and more open to revision or compromise than the VPA texts themselves.

CONCLUSION

Social obligations in the forest sector – including the redistribution of area- and volume-based taxes and fees, and contributions in kind by a logging company, to communities who live closest to and are most affected by large-scale logging operations – are a legal requirement in Cameroon, Ghana, Liberia and the RoC. The mechanisms for delivering these obligations vary with different contexts and structures in each country. Such variation may come from: the type and size of forest management or logging permit in place; the channels of payment (whether through national government agencies or direct from logger to community); the nature, content and signatories of a company-community social agreement; and wider political contexts such as how recently the forest sector legislative framework was revised. With each round of revisions to the legal framework, multi-stakeholder inclusion in decision-making, access to information, and communities’ ability to realise their rights tend to improve.

There are also large variations between the countries in actual amounts redistributed, in control over the redistribution and use and in the balance between area- and volume- based revenues redistributed. These variations make it difficult to quantify the extent to which communities benefit from logging or to identify a best-case scenario. For example, in Liberia and RoC, none of the nationally-collected volume tax is redistributed, and in the case of Ghana, there is no redistribution of national revenues to communities.

Nonetheless, it is clear that legal frameworks on social obligations are incomplete and precarious, leading to communities – and sometimes the State – not reaping the benefits they are owed by law. This can contribute to a build-up of huge tax arrears, failure to keep tax rates aligned with land values or timber prices, successful lobbying by industry to reduce taxes, and above all, procedures that are too complex for communities to navigate in order to claim benefits that are rightly theirs.

Their complexity renders social obligation systems open to abuse at many levels, and ‘local recipients’ rarely means communities themselves. Their intent might be to decentralise power but this often allows local elites – council members, government officials, traditional authorities – to stand in the way of the community members most affected by logging operations and capture most benefits.

International frameworks such as the FLEGT initiative have not yet fully encapsulated social obligations as they were expected to. The VPAs have to date prioritised the construction of systems that deliver legal timber to EU markets. They must now do more to secure substantive community rights, including benefit sharing and other social obligations that lead to genuine development gains, and give communities management control over forests in customary ownership.

A key weakness of the FLEGT initiative is that most attention has been paid to procedural rights of citizens – participation, access to information – and relatively little to substantive rights, such as to benefit sharing and other social obligations that lead to genuine development gains, and to give communities management control over forests in customary ownership.

Improving the delivery of social obligations should increase the engagement of forest-fringe communities with the commercial forest sector, and encourage them to start ask fundamental questions such as about customary rights to land and resources.

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Can wild forest foods contribute to food security and dietary diversity of rural populations adjoining forest concessions? Insights from Gabon, DR Congo and Cameroon

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HIGHLIGHTS

- A high diversity of forests foods for consumption exists in DR Congo, Cameroon and Gabon.
- Despite a diverse pool of wild foods, more than 80% of households engaged in logging suffer from food insecurity.
- A significant inverse correlation exists between food insecurity and forest foods consumption meaning that forest foods play a role in ensuring food security and nutrition among populations near forest concessions.
- Age and access to income, illegal logging and agriculture on logged land are significant determinants of food security among forest communities.
- Investing in strategies to provide income outside illegal logging and practicing agriculture on logged land, can contribute to addressing health, nutrition and food security.

SUMMARY

The potential of forest foods to address malnutrition, food insecurity and poor dietary intake is increasingly being recognized. However, most existing data presents average results of proximate analysis, overlooking the opportunities to document how forest foods contribute to nutrition, food security and dietary intake. In this study, food security was estimated using the HFIAS score while dietary intake was estimated using FFQ recalls among 720 households in and around six logging concessions in Cameroon, DR Congo and Gabon. There was a high diversity of forests foods consumed, with DR Congo (FFCS=16.2) registering the highest number. Cameroon had the highest number of food groups (HDDS=12.5) while Gabon had the highest number of food varieties (FVS=24.5). Despite a highly diverse pool of wild foods in the region, most households (82%) practicing farming on logged land suffered from food insecurity. A significant inverse correlation was observed between the HFIAS score and the FFCS ($r^2=-0.26$, $P=0.0002$), revealing that forest foods can play a role in ensuring food security and nutrition among populations near forest concessions. The chi-square test revealed that age >46 years, and access to income from business or salaries were associated with food security. Further work is required to document how wild forest foods can contribute to improved diets among these populations, including documenting the nutrient composition of more forest foods, integrating them into regional dietary guidelines and encouraging their domestication.

Keywords: forest-dwellers, forest concessions, biodiversity, dietary intake, forest foods

Les aliments sauvages peuvent-ils contribuer à la sécurité alimentaire et à la variété diététique des populations rurales jouxtant les concessions forestières? Découvertes provenant du Gabon, de la République Démocratique du Congo et du Cameroun

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Pour faire face à la malnutrition, à l'insécurité alimentaire et à un apport alimentaire appauvri, le potentiel des aliments forestiers est de plus en plus reconnu. Toutefois, la plupart des données existantes présentent des résultats moyens d'analyse approximative, faisant fi des opportunités de documenter la manière dont les produits forestiers peuvent contribuer à la nutrition, à la sécurité alimentaire et à l'apport alimentaire. Dans cette étude, la sécurité alimentaire a été estimée en utilisant le score HFAIS, alors que l'apport alimentaire était estimé en utilisant les rappels FFQ auprès de 720 foyers autour et au sein de six concessions de coupe au Cameroun, en République Démocratique du Congo et au Gabon. On trouva une haute diversité d'aliments forestiers consommés, la République Démocratique du Congo en enregistrant le plus grand nombre (FFCS=16.2). Le Cameroun comptait le plus grand nombre de groupes d'aliments (HDDS=12.5), alors que le Gabon pouvait se vanter de la plus grande variété d'aliments (FVS=24.5). Malgré la forte diversité d'aliments sauvages dans la région, la plupart des foyers (82%) pratiquant du fermage sur terres défrichées souffrait d'insécurité alimentaire. Une corrélation inverse importante était observée entre le score HFIAS et le FFCS ($r^2=-0.26$, $P=0.0002$), révélant que les aliments forestiers peuvent jouer un rôle en assurant la sécurité alimentaire et la nutrition dans les populations vivant proches des concessions forestières. Le test chi-square révéla qu'un âge >46 ans et l'accès à des revenus provenant de commerce ou de salaires étaient associés à la sécurité alimentaire. Un travail supplémentaire est nécessaire pour documenter la manière dont les aliments sauvages forestiers peuvent contribuer à améliorer les régimes dans ces populations, incluant la composition nutritive de davantage d'aliments forestiers, en les intégrant dans les lignes de conduite alimentaires régionales et en encourageant leur domestication.

¿Pueden los alimentos silvestres del bosque contribuir a la seguridad alimentaria y a la diversidad de la dieta de las poblaciones rurales adyacentes a las concesiones forestales? Perspectivas de Gabón, la República Democrática del Congo y el Camerún

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Cada vez se reconoce más el potencial de los alimentos del bosque para hacer frente a la malnutrición, la inseguridad alimentaria y una dieta deficiente. Sin embargo, la mayoría de los datos existentes presentan resultados promedio de análisis de constituyentes que pasan por alto las oportunidades de documentar la contribución de los alimentos del bosque a la nutrición, la seguridad alimentaria y la dieta. En este estudio, la seguridad alimentaria se estimó utilizando la puntuación de la HFIAS, mientras que la ingesta dietética se estimó utilizando cuestionarios de Frecuencia de Consumo de Alimentos (FCA) en 720 hogares dentro o alrededor de seis concesiones madereras en el Camerún, la República Democrática del Congo y el Gabón. Se observó una gran diversidad de Alimentos Forestales Consumidos (AFC=16,2), siendo la República Democrática del Congo la que registró el mayor número. Camerún mostró la mayor Diversidad Elevada de Dieta (HDDS=12,5) mientras que Gabón tuvo el mayor número de Variedades de Alimentos (VA=24,5). A pesar de la gran diversidad de alimentos silvestres de la región, la mayoría de los hogares (82%) que practican la agricultura en terrenos donde se ha talado el bosque sufren inseguridad alimentaria. Se observó una correlación inversa significativa entre la puntuación de la HFIAS y los AFC ($r^2=-0,26$, $P=0,0002$), lo que revela que los alimentos forestales pueden desempeñar un papel para garantizar la seguridad alimentaria y la nutrición de las poblaciones cercanas a las concesiones forestales. La prueba de chi-cuadrado reveló que la edad >46 años, y el acceso a ingresos procedentes de negocios o salarios, estaban asociados con la seguridad alimentaria. Es necesario seguir trabajando en documentar la forma en que los alimentos silvestres del bosque pueden contribuir a mejorar la dieta de estas poblaciones, como la composición de nutrientes de un mayor número de alimentos del bosque, su integración en las directrices dietéticas regionales y el fomento de su domesticación.

BACKGROUND

The most recent global food security report revealed that severe or moderate food insecurity is on rising among Central and West African countries, raising from 45.3% in 2014 to 53.6% in 2019 (FAO, IFAD, UNICEF, WFP and WHO, 2019). Food insecurity, undernutrition and micronutrient deficiencies undermine health, psychological wellbeing, work capacity and economic development (Mbhenyane 2017, Vollmer, et al. 2016). Then again, reports elsewhere indicate that undernutrition and micronutrient deficiencies are a persisting

public health challenges in Central Africa (Kamgaing et al. 2018), with Cameroon documented to have the highest stunting (a measure of height-for-age (HAZ) for individuals) (33%) and iron deficiency (45%) rates. While DR Congo has the highest vitamin A deficiency (42%) among women in the region. For the purposes of this paper, food security refers to the ability of communities, households, individuals and households to have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit 1996).

Millions of people in Central Africa, including the Congo Basin, rely on forests for food and income (Pimentel *et al.* 1997, Laird 1999, Ndoye and Tieguhong 2004, Tieguhong and Ndoye 2007, Fungo *et al.* 2016a). The economic growth attributable to the forest sourced foods and their products, ranges between 6 to 10% per annum economic growth (Sonwa *et al.* 2012). The World Bank additionally estimates that, more than 50% of the Congo Basin forest population depends, to varying degrees, on forests for livelihoods, not just for food but also for fuel, livestock grazing and medicine (World Bank 2006). Then again, Angelsen *et al.* (2014) and Tata-Ngome *et al.* (2017), reported that wild foods obtained from tropical forests, are as vital to the livelihoods of rural people in developing countries as agriculture. Forests can contribute about 30.3% household food (about \$304) including; fish, bush meat, fruits, vegetables and mushrooms important sources of proteins, vitamins and essential minerals for the rural poor households (Angelsen *et al.* 2014). The superiority of forest foods in contributing to essential nutrients and bioactive contents than the processed and imported foods has been documented in several African countries (Onimawo *et al.* 2003, Blaney *et al.* 2009, Fungo *et al.* 2015, Fungo *et al.* 2019). For example, in Gabon and Cameroon, forest foods have been reported to address both macro and micronutrient deficiencies and non-communicable disease disorders related with inadequate intake of bioactive compounds (Fungo *et al.* 2019, Blaney *et al.* 2009, Fungo *et al.* 2005). In Gabon, forest fruits of *Poga oleosa*, *Panda oleosa*, *Gambeya lacourtiana* and *Afrostryax lepidophyllus* if consumed in adequate daily amounts by a non-lactating and non-pregnant woman, they can provide their 100% daily nutrient requirements (DRI), for magnesium (1000 mg/day), iron (58.8 mg/day) and zinc (12 mg/day). Also, 100% DRI for vitamin E requirements of 0.4 mg/day for children and 19 mg/day for women can be met by consuming adequate amounts of fruits of *P. oleosa*, *P. oleosa* and *G. lacourtiana*. In neighbouring Cameroon, children aged between 1–3 years and women of reproductive age can get considerable amounts of vitamins C, A and E, selenium, calcium, iron and zinc from forest foods (Fungo *et al.* 2016). Tata *et al.* (2019), further revealed that forests can provide foods that are protective against anaemia in women and children. Bush meat and fish are the major animal source foods providing significant amounts of digestible iron that is responsible to address anaemia among communities residing near forest concessions (Nasi *et al.* 2011, Fa *et al.* 2015). Furthermore, in the last decade, studies have documented positive correlations between household dietary diversity with presence of forests (Powell *et al.* 2012, Johnson *et al.* 2013, Ickowitz *et al.* 2014, Fungo *et al.* 2016a). For example Ickowitz *et al.* (2014), reported positive correlations between forest cover and dietary diversity, among forest dependent communities in 21 African countries.

It has been reported that forests provide food and other subsistence products to approximately 60 million people who live within and near them (De Wasseige *et al.* 2014, Marquant *et al.* 2015) as well as contributing to the nutrition of another 40 million people who live in urban areas near the forest estates (Nasi *et al.* 2011). However, to date few dietary intake and food security assessment studies have documented how

wild forest foods can be used to address food insecurity and improve dietary intake among populations residing near concessions. In particular, studies that combine assessment of forest food consumption scores with food insecurity assessment techniques and dietary assessment methods are limited. It consequently remains unclear how forest biodiversity contributes to food security and dietary intake for rural populations in Central Africa. Therefore, the overall objective of this study was to investigate the role of wild forest foods in diet and food security of villagers living in forest environments in Gabon, Cameroon and DR Congo. It describes the dietary indices of women, evaluates their food insecurity security categories and their coping mechanisms and documents the relationship between food consumption indices and food security indicators. Furthermore, the determinants of food insecurity among forest foods consumers were analysed.

METHODS

Study concessions

The study was carried out among communities residing in or around six purposefully selected forest concessions (Table 1), adjoining forests in Cameroon, Gabon and DR Congo. These three countries account for more than 80% of the forest cover of Central Africa (Tchatchou *et al.* 2015). Study concessions were selected based on: existence of trees of multiple use (timber/food value); ease of access to sites for the research team; the willingness of the forest concessionaires to allow the study to be implemented in or around concession villages; and the presence of village populations and various ethnic groups willing to participate in the study. Concessions were selected to determine whether their logging activities were reducing access to forest foods for villagers, concessions that were actively logging were selected.

Concessions, districts, villages and households' selection design

A four-stage cluster sampling technique involving two stages of purposeful selection and two stages of randomization were deployed during the selection of the study villages and households. The first stage involved selecting concessions, following the criteria outlined above. The second stage involved purposefully selecting districts within each concession on the basis of their accessibility, ethnicity and willingness of the community to participate in the study and ongoing logging activities in the surrounding forests. The third stage involved selecting five villages randomly within the two chosen districts. With the assistance of the village authorities including village chiefs, study villages were mapped and listed using village transect walks. Households and their occupants were listed in each village for random selection. The fourth stage involved selecting 24 households randomly within each village. This resulted into a total of 720 households (6 concessionaires*5 villages per district*24 households per village=720 households). The survey was simultaneously conducted in and around the six forest concessions.

TABLE 1 Characteristics of the concessions in Cameroon, Gabon and DR Congo

Country Concession	Cameroon		Gabon		DR Congo	
	Société Camerounaise de Transformation du Bois (SCTB)	Fabrique Camerounaise de Parquet (FIPCAM)	Convention Provisional Planning operations and Transformation (CPAET) of Bayonne	Compagnie Equatoriale des Bois (CEB)	Congo Compagnie de Transport et d'Exploitation Forestière (COTREFOR)	Compagnie Forestière de Transformation (CFT)
Longitude	3.50 and 4.15 N	2.24 and 2.93 N	1.0 to 29.36S	13.00 to 320.68 E	25.20 and 26.00 E	25.3 to 26.00E
Latitude	13.18 and 14.20 E	11.13 to 11.40 E	11.00 28.37 E	00.0 to 83.36N	0.65 to 1.25N	0.00 to 0.55N
Location	East	South	South West	South East	North East	North East
Existence of management plan	NO	Yes	Non	Yes	Non	Non
Ethnic groups	Bulu and Baka pygmies	Kako, Pol and Baka pygmies	Nzebi, Sira (Punu) and Mbete	Nzebi, Mbete and Sira (Punu)	Bamanga, Popoi, Boa, Lokele, Turumbu, Mbole, Kumu, Lendu, Wagania, Rega, Topoke, Turumbu, Basoko and Alur	Bamanga, Boa, Lendu, Lokele, Turumbu, Mbole, Kumu, Wagania, Rega, Topoke, Lokele, Turumbu, Basoko and Alur

The interviews

Structured questionnaire-based interviews were administered to collect data on socio-demographic characteristics, household food insecurity access scale (HFIAS) and food consumption from 720 non-pregnant and non-lactating women older than 18 years who were married or cohabiting. For polygamous households, one respondent among the wives of the household head was selected to respond on behalf of the rest of household members in case the entire household (including her co-wives) were preparing one meal for the entire family. In case house wives were preparing food separately for their children and husband the respondent responded to questions with reference to only those she took care of in her household. Women were interviewed because in rural African settings they are responsible for food collection and preparation and are custodians of knowledge on wild and forest foods, that is passed on from generation to generation (Maundu 1992, Becquey *et al.* 2009). Interviews took place in the respondents' homes, during the months of May-October 2012. The long rainy season in the region commences in May and ends in November (United Nations Environment Programme 1999). The questionnaires were pre-tested and translated into local languages for those that could not speak French by educated and locally recruited Field Assistants.

Household characteristics

Household characteristics documented included information on the age, gender, economic occupation, education level of the head of household, source of water used in household and period of stay in the study area.

Dietary diversity scores

Dietary diversity scores were obtained using a seven day recall food frequency questionnaire that was designed preceding the survey to capture information. A total of thirteen food groups were assessed including the twelve food groups specified in the FAO guidelines for measuring household and individual dietary intake, in addition to the food group for healthfully important forest foods (Arimond *et al.* 2010, FAO 2011). The food groups were: (i) cereals and wheat products; (ii) roots and tubers; (iii) legumes and lentils; (iv) nuts; (v) dairy and fats; (vi) meat; (vii) poultry; (viii) fruits; (ix) fish and seafood; (x) vegetables; (xi) alcoholic drinks; (xii) non-alcoholic beverages ; and (xiii) forest foods (including bush meat, honey, caterpillars, wild fruits, roots and vegetables). In the present study, forest foods were defined as foods of plant and animal origin, which were growing wildly and collected from forests (Agbogidi 2010). The food items consumed were distributed among the thirteen food groups and the household dietary diversity score (HDDS) was calculated by summing the number of food groups consumed. The food variety score (FVS) was computed as the number of different food varieties or items consumed over the recall period of 7 days. The forest food consumption score (FFCS) was calculated by summing the occurrences and incidents of consuming of forest food items and varieties (FAO 2011).

Household food insecurity assessment

The Household Food Insecurity Access Scale (HFIAS) was assessed following the method described by Coates *et al.* (2007). A set of nine standard questions was posed to women, who responded on behalf of other household members. The HFIAS score is a continuous indicator ranging from 0 (food secure) to 27 (maximum food insecurity) (Coates *et al.* 2007), with the score categorized into four levels of household food insecurity: food secure (score=0), mildly food insecure (score=1–13), moderately food insecure (score=14–16) or severely food insecure (score=17–27). The household food insecurity access scale score (HFIAS Score) and the household food insecurity access prevalence categories (HFIAP categories) were calculated by country. The household food insecurity occurrence and coping mechanisms and food insecurity categories per concession were also calculated. The HFIAS score was calculated for each household by summing the codes for each frequency of occurrence question. The higher the HFIA score, the more food insecure (access) the household experienced. The HFIAP categories per country and between consumers and non-consumers of forest foods consumers were also computed by adding the occurrence of different categories of food insecurity.

Data analysis

All data were analysed using the statistical software package IBM SPSS Statistics Version 21.0 and statistical significance was set at $P < 0.05$ for all tests. The mean values were computed for continuous variables while proportions were computed for the categorical variables. Differences between means or proportions were considered statistically significant if $P < 0.05$. To assess how forest foods are related to food security, logistic regression analysis and Spearman's correlation analyses were performed. Chi-square tests were further performed to assess the determinants of food insecurity among forest food consumers. Respondents were dichotomized into food secure and food insecure, the latter including those who were suffering from mild, moderate and severe food insecurity.

RESULTS

Characteristics of study populations

A total of 720 households were surveyed. The mean age of the sampled female respondents was 46 years (SD = 10.4) with a range from 17 years in both DR Congo and Cameroon to 89 years in Gabon (Table 2). The majority of respondents interviewed were monogamously married with about 85% of these marriages registered in Cameroon, 58% in Gabon and 100% in DR Congo. In terms of household size, Gabon had the fewest household members (5) while DR Congo had the most (8). About a quarter of respondents in each country had no formal education while three quarters of the total respondents in both Cameroon and Gabon and 100% in DR Congo,

did not have access to protected water sources. Despite living in forests, more than 90% of the respondents in each country were farmers who also practiced illegal logging. More than three quarters of the respondents in all the countries were natives of the study sites and 72% or more had lived there for more than 10 years.

Household dietary diversity, food variety and forest food consumption scores

Respondents' FVS for the seven days preceding the interview ranged from 11 to 23 in Cameroon, 16 to 28 in DR Congo and 17 to 30 in Gabon (Table 3). During the seven day recall period, each individual reported consuming from 11 to 23 food items in Cameroon; from 16 to 28 food items in DR Congo; and from 17 to 30 food items in Gabon. In Cameroon, the majority of the respondents (67%) consumed 15 to 19 different food items over the seven day period, while in DR Congo about 50% of the respondents consumed 17 food items, and in Gabon 67% of the respondents consumed 23 to 25 food items. In terms of food groups, about 50% and 60% of the respondents in DR Congo and Cameroon, respectively, ate items from all the thirteen food groups during the seven day recall period. In Gabon, respondents reported consuming from only 11 food groups. While 94% of respondents in Cameroon had DDS of 12–13 (consumed food items from thirteen food groups), with a mean of DDS 12.5 ± 0.7 food groups, in Gabon 79% respondents had DDS of 9–10 (mean DDS 9.6 ± 0.8 food groups) and in DR Congo 100% respondents consumed DDS of 11–13 (mean DDS 11.9 ± 1.0 food groups).

As regards forest food consumption, the highest was registered in DR Congo with FFCS ranging from 15 to 18 forest foods consumed during the seven day recall period. Ninety-five percent of respondents in DR Congo had high forest food consumption (FFCS of 16–17), with a mean FFCS of 16.5 ± 0.59 forest food varieties. In DR Congo animals sourced foods were the most consumed including; caterpillars (*Gonimbrasia belina*), snails (*Gastropoda*) and cat fish (*Siluriformes*). Wild mushrooms (Fungi) commonly consumed forest foods. In Cameroon the FFCS ranged from one to eight, with the largest group (31%) reporting having eaten three forest food items (mean FFCS 3.97 ± 1.6) during the seven day recall period. Most consumed forest foods in Cameroon included; *Irvingia gabonensis* (bush mango), a wildy growing fruit used for cooking oil production and as a food thickening agent in soups and stews, and wildy growing oranges (*Citrus spp.*). Other forest foods included wildy growing yams (*Dioscorea spp.*) and forest harvested nuts, Bambara groundnuts (*Vigna subterranea*). Among the forest vegetables, *Solanum nigrum* was the widely consumed greens. Among the meats, (porcupine and rats), were the most commonly consumed in Cameroon. Gabon registered the fewest forest food varieties and items consumed, with FFCS ranging from one to three. In Gabon, taro (*Colocasia esculenta*), porcupine and wild birds were the most consumed. Seventy-three percent of the respondents interviewed did not consume any type of forest food.

TABLE 2 *Socio-demographic characteristics of households in Cameroon, Gabon and DRC*

Household characteristics	Cameroon	Gabon	DRC
	% of households (n=278)	% of households (n=241)	% of households (n=201)
Age			
Mean $\pm$ SE	44 $\pm$ 3	55 $\pm$ 9	38 $\pm$ 2
Minimum	17	21	17
Maximum	82	89	65
Marital status			
Single	9	25	
Married (monogamous)	85	58	100
Married polygamous	6	17	
Household size			
Mean $\pm$ SD	6 $\pm$ 3	5 $\pm$ 3	8
Minimum	1	1	-
Maximum	14	17	-
Education			
No formal Education	26	31	22
Primary school completed	42	35	57
Secondary school	22	33	21
University	10	2	
Source of water			
Unprotected	80	71	100
Protected	20	29	
Occupation (%)			
Farming and unlicensed logging	97	89	100
Salaried employee	2	6	
Business owner	1	3	
Other		3	
Residence within the study area (%)			
<1 year	2	12	-
1–5 years	11	8	-
5–10 years	6	8	-
>10 years	81	72	100

Household food insecurity access and prevalences scales

According to the HFIAP categorization, nearly half (48%) of the respondents in Cameroon, and 100% and 88% of households in DR Congo and Gabon, were respectively, severely food insecure (Table 4). Cameroon had the highest number of food secure households (20%), followed by Gabon with only 4%. None of the households surveyed in DR Congo were registered as food secure. Categorizing all forms of food insecurity of HFIAS by forest concessions revealed that the average HFAIS scores were significantly different between

the two forest concessions in both Gabon and Cameroon (Table 5). For instance, in Cameroon, the proportion of households that were food-insecure around SCTB concession without a forest management plan, was significantly higher (at $P \leq 0.0001$) than the proportion that were food-insecure in FIPCAM (74 vs. 5%, respectively). In Gabon, the average proportion of households that were food-insecure was significantly higher around CEB without a forest management plan, compared to those registered in Bayonne (96% vs. 89%, respectively) at $P \leq 0.03$. However, in DR Congo, the populations in and around both concessions were all (100%) food-insecure.

TABLE 3 Food varieties consumed (FVS)^a, household dietary diversity score (HDDS)^b and forest food consumption frequency (FFCS)^c and mean dietary scores over a period of seven days in Cameroon, Gabon and DR Congo

Cameroon			DR Congo		Gabon	
% of households (n=278)	SD		% of households (n=241)	SD	% of households (n=201)	SD
Food variety score (FVS)						
11	0.4	16	1	17	1	
12	1	17	48	20	2	
13	1	18	9	21	1	
14	5	19	4	22	7	
15	6	20	20	23	19	
16	10	21	13	24	25	
17	14	22	5	25	23	
18	19	28	0.4	26	9	
19	18			27	8	
20	12			28	4	
21	9			29	2	
22	3			30	1	
23	1					
Mean	18	2	19	2	25	2
Household dietary diversity score (HDDS)						
≤9	0.4	≤11	50	≤8	6	
10	1	12	1	9	47	
11	4	13	49	10	32	
12	34			11	15	
13	60					
Mean	13	1	12	1	10	1
Forest food consumption score (FFCS)						
0	2	15	3	0	73	
1	3	16	47	1	20	
2	9	17	48	2	5	
3	31	18	3	3	2	
4	19					
5	16					
6	14					
7	4					
8	1					
Mean	4	2	17	1	0.4	1

n: Number of households

^a: FVS is food variety score, i.e. the number of food items/species consumed by the respondents^b: Dietary diversity score is the average sum of the number of food groups consumed^c: FFCS (forest food consumption score), is total number of forest food species consumed in a seven day period.

TABLE 4 Household Food Access Insecurity Prevalence per category per country

Household Food Insecurity Access Category	Cameroon	DR Congo	Gabon
	% of households (n=278)	% of households (n=241)	% of households (n=201)
Food Secure	20	0	4
Mildly Food Insecure Access	8	0	0
Moderately Food Insecure Access	25	0	9
Severely Food Insecure Access	48	100	88

TABLE 5 Food Insecurity in all degrees, among the residents of the six concessions in the sample countries

Country	Company	Food insecurity % (n)	P Value (Significance for difference between concessions)
Cameroon	SCTB	74 (99)	P=0.001
	FIPCAM	5 (2)	
DR Congo	COTREFOR	100 (121)	P=0.76
	CFT	100 (120)	
Gabon	Bayonne	89 (40)	P=0.04
	CEB	96 (125)	

*calculated using X²-tests for factor variables; ANOVA for comparison of means, set at p=0.05

Occurrence and coping strategies for Household Food Insecurity Access

With regards to HFAIS occurrences, several coping strategies to address food insecurity were used in varying degrees by the respondents from the three countries. The respondents in Cameroon were the most food secure, thus fewer respondents employed the coping strategies listed under the HFIAS scale compared to the respondents in DR Congo and Gabon. For example, in Cameroon, during food-insecurity episodes, just over half of the households deployed three coping strategies including 53% who reported eating just a few kinds of foods, 62% who ate smaller meals and 54% who ate fewer meals in a day. On the other hand, in DR Congo, more than 80% of the households used seven coping strategies including: expressing anxiety and uncertainties about accessing food; eating a few

kinds of foods; eating foods they do not want to eat; eating a smaller meal; eating fewer meals per day; and not eating any kind of food. In Gabon all the nine strategies listed HFIAS were used by more than 70% of the households interviewed.

Relationship between forest food consumption and food insecurity and dietary intake

Logistic regression analysis revealed that forest food consumers were 90% (OR=0.9; 95% CI 0.71, 4.01; p=0.001) more likely to be food secure compared with non-forest food consumers (Not in table). There was no significant difference in the proportion of consumers of forest foods who were food secure as compared to non-consumers (12% vs 11%, respectively; p=0.74) (Table 6). However, fewer consumers of forest food reported severe food insecurity (60% as compared

TABLE 6 Food security/insecurity by category among consumers of forest food and non- consumers in sampled villages

HFIAS ^a	Percentage among consumers of forest foods (n=567) ^b	Percentage among non-consumers of forest foods (n=153) ^c	P* value (significance of difference between the two groups)
Food secure (0)	12	11	P=0.74
Mildly insecure (1–13)	9	6	P=0.03
Moderately insecure (14–16)	20	14	P=0.0001
Severely insecure (17–27)	59	68	P=0.0001

^a: Household Food Insecurity Access Scale. Numbers in parentheses represent the cut off of HFIAS for each food security category

^b: Eating at least one forest food during the seven day recall period

^c: Did not eat forest foods during the seven day recall period

*calculated using X²-tests for factor variables; ANOVA for comparison of means, set at p=0.05

to 69%, $p \leq 0.0001$; Table 6). When the results were further subjected to Spearman's correlation analysis, it was observed that among forest food consumers, the mean HFIAS score was significantly and inversely correlated with the FFCS ($r^2 = -0.26$, $p = 0.0001$) (Table 7). This suggests that households that consumed more forest foods were less food insecure. Statistically significant positive correlations between the FFCS and the FVS ($r^2 = 0.29$, $p = 0.05$) and between the FFCS and the HDDS ($r^2 = 0.25$, $p = 0.0001$) further support the association between higher forest food consumption and reduced risk of food insecurity.

Socio-demographic factors affecting food security among consumers of forest foods

The chi square test analyses in the present study revealed that among forest foods consumers, only a minority of food secure households (31%) had a younger household head (<46 yrs) while the majority of food insecure households (81%) have a younger household head. (Table 8). A high proportion of respondents (~82 %) who were food insecure relied on illegal logging and subsistence farming on previously logged and abandoned land. Food insecure households the share is significantly lower (18%). The 18% of those who were food-secure described themselves as business owners and 15% as salaried employees.

DISCUSSION

Contribution of forest foods to dietary indices

To the best of our knowledge, this is the first regional study in which the relationships between food insecurity and HDDS, FVS and FFCS have been assessed among forest dwelling populations in Central African countries of Cameroon, Gabon and DR Congo consuming all types' of foods that were both plant and animal sourced. Although, Tata-Ngome (2016) quantified food insecurity in Cameroon, the quantification in Cameroon was a derivative of consuming only fruits. Furthermore, Tata-Ngome (2016) did not assess household dietary patterns and nutrient adequacy indicators of HDDS, FVS and FVS. Consuming a variety of foods (HDDS, FVS and FFCS),

is considered a useful indicator of household food security (Mbhenyane 2017, Hoddinott and Yohannes 2002) and a key proxy of nutrient adequacy (Rathnayake *et al.* 2012), which is apparent in most dietary patterns across Africa. In the present study, a high consumption score for forest foods (FFCS) was registered in DR Congo and Cameroon, while in Gabon, a high food variety score (FVS) was registered. Previous studies in DR Congo (Termote *et al.* 2012) and Cameroon (Tata-Ngome 2015, Fungo *et al.* 2016b), documented how forest foods can mitigate food insecurity and health disorders related to inadequate intake of nutrients, if consumed in adequate amounts. In Benin, a higher diversity score and higher food security were documented among the population residing around the precincts of the government owned forest reserve in the North West of the country, than among the populations in urban centres of Parakou city. This was attributed to increased access to forest tree foods (Van Liere *et al.* 1995). In Benin, the government grants periodic permits to residents to collect forest foods from the forest reserve.

Household food insecurity and coping strategies

The most recent United Nations food security report revealed that more than half (54%) of the total population in the Congo Basin Region were food insecure (FAO, IFAD, UNICEF, WFP and WHO 2019). The present study found a much higher prevalence of food insecurity, with 78 % of the populations participating in this study being categorized as severely food insecure, 17% as moderately and 8% as mildly food-insecure. The high prevalence of food insecurity among the respondents in the present study may be due to the majority having low levels of education, to the high proportion of respondents (~82 %) relying on illegal logging and subsistence farming on previously logged and abandoned land for income in the three countries and having a large number of household dependents. Previous studies in Cameroon (Fungo *et al.* 2016b, Tata-Ngome *et al.* 2017) and in DR Congo (Termote *et al.* 2012) have attributed high food insecurity among forest food consumers to low volumes of forest foods consumed, seasonal availability of forest foods and practicing agriculture on previously logged degraded land. This was corroborated in studies carried out by Levang *et al.* (2015), Tata-Ngome (2015) and Leakey (2019), who reported that the forest

TABLE 7 Spearman's correlation matrix of food security indicators for forest communities of the six concessions

Household food security	Household dietary diversity score	Forest food consumption score	Food variety score	Household food insecurity access scale score
Household dietary diversity score ^a	1	0.25**	0.46**	-0.13*
Forest food consumption score ^b		1	0.29*	-0.26**
Food variety score			1	-0.11
Household food insecurity access scale score				1

*, **: Correlation is significant at 5% and 1% level respectively.

^a: The maximum score includes 13 food groups

^b: Only forest food species were included in the count group

TABLE 8 Comparison per socio-demographic factor among food secure and food insecure consumers of forest foods consumers in sampled villages

Characteristics	Forest food consumers (n=567)		
	Food secure % (n=69)	Food insecure (%) n=498	P* (Significance for difference between food secure and food insecure)
Age groups			
<46 years	31	81	P=0.03
>46 years	69	19	P=0.01
Marital status			
Single	3	5	P=0.89
Married (monogamous)	71	67	P=0.05
Married (Polygamous)	26	28	P=0.68
Education			
No formal Education	75	77	P=0.72
Primary school	17	13.7	P=0.54
Secondary school	6	6.4	P=0.79
University	1	2.6	P=0.75
Source of water			
Unprotected	92.8	90.8	P=0.15
Protected	7.2	9.2	P=0.09
Occupation			
Farming on previously logged land and unlicensed logging	65.2	82.1	P=0.04
Salaried employee	14.5	10.0	P=0.08
Business owner	20.3	7.9	P=0.03
Residence within the study area			
<1 year	4.3	0.2	P=0.02
1–5 years	8.7	10.2	P=0.24
5–10 years	5.8	4.2	P=0.38
>10 years	81.2	85.4	P=0.51

*calculated using X²-tests for factor variables; ANOVA for comparison of means, set at p=0.05

food and fruits gatherers and also practicing agriculture on degraded logged land, suffer worse food insecurity than those practicing agriculture alone. This may reflect the fact that those who are short of food from abandoned logged agriculture land rely on forest foods as a safety net (Shackleton and Shackleton 2004, Kuhnlein *et al.* 2007). Similar studies conducted among the forest communities of Benin (Boedecker *et al.* 2014) and Burkina Faso (Maisonnette *et al.* 2014) revealed that despite the communities' having access to highly diverse forest diets, low dietary intake and high food insecurity were rampant among these communities. Food insecurity in Burkina Faso and Benin were attributed to the seasonality of forest foods, the annual and regional variations in food availability, and the small portion sizes of forest foods consumed.

Coping strategies are the methods used by households or individuals to meet their food and nutrient requirements, or survive when faced with food scarcity (Ellis 2000). In the present study, different coping strategies listed under the HFAIS scale (Coates *et al.* 2007) were adopted by food-insecure households. In Cameroon, among respondents who were the most food-secure, fewer employed the coping strategies, as compared to the respondents in Gabon and DR Congo, who were faced with more severe food scarcity. For instance, worrying about not having enough food in the household was experienced by fewer than 50 percent (43%) of the food insecure respondents in Cameroon, compared to 98% and 94% of DR Congo and Gabon respondents, respectively. On the other hand, communities in DR Congo and Gabon who suffered from severe food insecurity, deployed

progressively more coping strategies as food insecurity levels increased in these two countries. For example, almost all (94% to 100%) of the food-insecure respondents in DR Congo and Gabon employed four coping strategies: consumption of only a few kinds of foods, not eating preferred foods, eating a smaller meal and consuming foods that the respondents did not really want. In Cameroon, DR Congo and Gabon, about 30%, 40% and more than 70%, respectively, of the respondents that were food-insecure would go a whole day and night without eating and went to sleep hungry; some did not have any kind of food. Tata-Ngome (2016) reported a much higher population of 50% going to sleep hungry. Food insecurity results in decreased nutrient intake (Berman *et al.* 2014). This was confirmed in this study, with the majority of the food-insecure respondents from Cameroon (62%), DR Congo (~100%) and Gabon (96%) cutting portion sizes, and 54%, 99% and 95%, respectively, consuming fewer meals.

Relationship between food consumption indices and food security

Spearman's correlation analysis and regression modelling in the present study revealed that greater forest food consumption was significantly and positively associated with increased dietary diversity and food security among consumers of forest foods. The significant inverse correlation between FFCS and HFIAS, and the positive correlation between FFCS and HDDS and FVS, indicate that forest foods may be playing a significant role in household and community food security and nutrition. These findings are in agreement with findings among forest dependent women of reproductive age from Embolowa region and Bertoua region in the South and East, in Cameroon (Tata-Ngome 2017, Fungo *et al.* 2016b) and among children and women residing in Awajún forests of Peru (Roche *et al.* 2008) and among rural household farmers of northern Ethiopia (Maxwell *et al.* 2014). In Cameroon, Fungo *et al.* (2016a) and Tata *et al.* (2017) observed a positive relationship between the forest food consumption score and household dietary diversity score, food variety score and food security. Among the Awajún community of the Amazonian forests of Peru, Roche *et al.* (2008) reported a positive association between the traditional forest food diversity score and food security, with dietary intakes higher among the forest-dependent communities residing in the lower Cenepa River region of the Awajún community.

The majority of previous studies relating dietary diversity to household food insecurity focused on assessing household dietary diversity, individual or women's dietary diversity by measuring conventional food groups or individual food items over a fixed period of time (Ruel 2003). However, in the present study and the previous study reported by Fungo *et al.* (2016b) in Cameroon, the score of forest foods consumption (FFCS) was added to the list of commonly used dietary diversity indicators that assessed household food security. As a result of high biodiversity in the study areas in Cameroon, Gabon and DR Congo, and the high nutrient content of

several forest foods (Kana-Sop *et al.* 2008, Djoulde *et al.* 2012, Fungo *et al.* 2015 and Fungo *et al.* 2019), inclusion of the FFCS indicator is a useful complementary measure for assessing dietary diversity and food security among the forest dependent communities.

Determinants of food insecurity among forest foods consumers

The proportion of respondents in the present study that prepared household meals using forest foods (79%) was considerably higher than what has been reported elsewhere in the Congo Basin countries of Cameroon (Fungo *et al.* 2016) and DR Congo (Termote *et al.* 2012). In the villages of Turumbu and Kisangani (DR Congo), 22% of the forest-dwelling population was reported to prepare meals with forest-sourced foods (Termote *et al.* 2012) while in the South and East regions of Cameroon, about 40% of the population prepared meals with forest foods (Fungo *et al.* 2016b). The higher consumption of forest foods documented in the present study may be attributed to greater number of respondents (720) sampled from villages close to forest concessions, as compared to the 278 in Cameroon and 241 in DR Congo sampled from towns and cities by Termote *et al.* (2012). The chi-square test analysis in the present study revealed that food security of households consuming forest foods was higher when the head of household was aged 46 years and above. Previous studies have documented improved food security status among older household heads who consumed forest and wild foods (Pelto *et al.* 2004, Tata-Ngome *et al.* 2017, Fungo *et al.* 2016b). A study from eMantlaneni village in the East of South Africa, revealed that elderly household heads were not only more knowledgeable about wild foods but also these households were more food-secure than households with younger household heads (Dweba and Mearns 2011). Other studies revealed that older household heads experience more stable household food security (Egger and Dixon 2014) and associated this with their better access to land and capital, a major factor to producing their own foods, than younger household heads (Egger and Dixon 2014, Tata-Ngome 2015). This study found, also, that households with income from salaried employment or business ownership, were more likely to be food-secure.

The high food insecurity recorded among the younger respondents in the present study may be attributed to rapid westernization of diets in Congo Basin forest countries, easier access to imported and processed foods than forest foods and associating consumption of forest or wild foods with poverty (Rensburg *et al.* 2007, Fungo *et al.* 2016a). The aggressive promotion of imported and processed food crops, by industrialists, agricultural research centres and government extension officers have been documented as some of the bottlenecks hindering use of forest foods and traditional Indigenous foods to address the high food insecurity in rural Africa (Dweba and Mearns 2011, Keller *et al.* 2006, Rensburg *et al.* 2007). This is associated with an inability of the older generation

to successfully pass on their Indigenous knowledge about African forest foods to the younger generation, exacerbating the substitution of forest foods with imported foods in Africa (Fungo *et al.* 2016a).

Studies elsewhere in Africa, including among rural communities in South Africa (Pelto *et al.* 2004), Cameroon (Fungo *et al.* 2016a, Tata-Ngome 2015) and Uganda (Tabuti *et al.* 2004) have reported better food security among forest-dependent communities with little or no formal education. The findings in the present study corroborate previous findings in Cameroon, which revealed that the uneducated consume more of the wild forest foods than the educated (Fungo *et al.* 2016a). In contrast, the food-secure coastal Mediterranean populations of Europe with a higher nutritional knowledge, consume more nutrient-rich wild and forest foods than the less educated in Europe (Serra-Majem *et al.* 2007). Fungo *et al.* (2016a) further attributed the difference in the results between the Mediterranean study and the present African studies to socio economic status, health consciousness among the populations of the two continents. African elites with higher income have tended to move away from eating traditional forest foods with strong cultural identity, to consuming less nutritious western foods (Pingali 2007). In many such communities in central Africa, forest foods are increasingly being replaced by imported and refined foods that have high saturated fats and sugars (Frison *et al.* 2006). For instance, in Gabon, where forest foods are widely being replaced with refined imported diets, diet-related non-communicable diseases including obesity, type 2 diabetes and cardio-vascular diseases are on the rise, especially among the urban elite (Siawayaya *et al.* 2015). Studies among forest populations of Central Africa have suggested that populations residing in or around forests that are designated as concessions for timber logging may be restricted from obtaining nutrient-rich forest sourced foods (Laird 1999, Blaney *et al.* 2009, Guariguata *et al.* 2010, Tata-Ngome *et al.* 2017). These restrictions can have an impact on the food security, health and welfare of these populations. In Cameroon and Gabon, about 50% of the forests are allocated to logging concessions, which are legislatively protected areas. It has been hypothesized that this may, or has, limited the surrounding populations' access to nutrient rich forest foods (Blaney *et al.* 2009, Rist *et al.* 2012, Tata-Ngome *et al.* 2017). For example, in the North of DR Congo, Hardin and Auzel (2001), reported how one logging company that employed about 650 workers, consumed 390 tons of bush meat (live animal weight), or close to 35 000 animals per year, depriving the surrounding communities of an important source of proteins and micro nutrients. Consumption of wild animals by logging company employees deprives communities of important sources of dietary fat and other energy sources, leading to severe food insecurity (Bailey and Peacock 1988). However, recent studies have found that the situation for other forest food resources is not so clear: for one thing, trees below the minimum cutting diameter provide both fruits and edible caterpillars, but are not cut by industrial loggers; for another, not all commercial-sized trees are removed in harvesting operations, as some

have poor form and others are inaccessible; and thirdly, local people tend to gather forest foods within a limited radius of their villages (Noutcheu *et al.* 2016, Muvatsi *et al.* 2017, Taedoum *et al.* 2018).

The potential of forest foods to address food insecurity has been neglected by governments, donors, non-governmental organizations and community-based initiatives for decades, yet it represents an opportunity worth exploring further (Fungo and Tieguhong 2019). Integration of forest foods into agro-forestry interventions and policies for better food and nutrition security coupled with sustainable use of forest biodiversity, could contribute to addressing food insecurity among rural populations in Central Africa (Leakey 2013, 2014, 2017). A limitation of this study is that it focuses on forest dependent communities residing around logging concessions. The results can thus not be generalized to all forest dependent communities in general. Furthermore, this was a cross-sectional study and no causal pathways between food insecurity and dietary diversity could be drawn. Although this study has revealed that some socio-demographic factors are associated with food and nutrition security among consumers of forest foods, the study does not provide the reasons for the rampant food insecurity in Central Africa. Longitudinal studies are thus recommended to further explore relationships. Finally, this study was carried out at during the peak of the rainy season within the region, which relates with the most food secure period of the year in Central Africa. To increase the significance of the results, the same research could be repeated during the dry season because forest foods availability is dependent on seasonality.

CONCLUSION

This study points to a serious problem of household food insecurity among communities residing adjacent to the forest concessions in Congo Basin, affecting about 90% of respondents. The results provide some of the first insights into the food insecurity status and dietary diversity measures among communities adjoining forest concessions. Across the region, a high food insecurity score was found among both those who consume forest foods, who were most frequent in DR Congo, and among those who did not, in Gabon. A high forest foods consumption score (FFCS) in DR Congo did not result in food security. However, fewer consumers of forest foods were severely food insecure than was the case for those who did not consume forest foods. Furthermore, an inverse relationship between FFCS and HFIAS and the positive correlation between FFCS and HDDS and FVS, implies that forest foods have the potential to contribute to addressing food insecurity in the Congo Basin. Given that access to income from sources other than agriculture on logged land and illegal logging was associated with higher food security, investing in ways to provide income outside of these areas could contribute to addressing health, nutrition and food security. To sustainably address food insecurity in the three countries, urgent action is required to promote, domesticate and conserve nutrient-rich forest foods that are locally acceptable.

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The informal sawn wood value chains in Uganda: structure and actors

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HIGHLIGHTS

- There is increased forestry sector informality in Uganda as small-scale operations expand.
- The shift from natural to planted forests as the primary wood source has led to sector fragmentation.
- Small volumes from predominantly individual players aggregate to an estimated production of up to 476,000 m³ of sawn wood annually.
- Current regulations facilitate informality, being administratively burdensome for formal small-scale operations.
- Policies have succeeded in increasing planted forests but not yet in fostering effective and efficient utilization of the tree resources.

SUMMARY

With increasing scarcity and spatial dispersion of tree resources, Uganda's forest sector – similarly to several other countries in Sub-Saharan Africa – has experienced a shift from the large-scale concessionary model historically used to access and harvest forests, to more versatile models involving smaller-scale operators. The timber they produce is sold not only locally in producer countries but also across borders and beyond. Yet small-scale operators largely work outside established regulatory frameworks and as such remain invisible to national and international production and trade statistics, rendering these players voiceless during policy-reform processes. Uganda is no exception, and little is known about the nature of people involved in various small-scale forestry activities, the constraints they face in day-to-day operations, and the dynamics that influence these aspects. Through 452 interviews, of a random sample of actors engaged directly in the sawn wood value chain, conducted between 2016 and 2019, this paper describes sawn wood flows from production areas to markets in Uganda. It assesses the socio-economic characteristics of operators and the organisation of activities. Findings indicate that the majority of actors in the informal sawn wood value chain are adult males, belonging to a limited number of ethnic groups, exogenous to logging areas and generally deriving their income from the timber business. The sawn wood value chain shows a high degree of fragmentation, with low levels of organisation and lack of vertical and horizontal integration. We conservatively estimate the total volumes sold annually between 386,000 and 467,000 cubic meters of sawn wood. With the expected progressive shift from natural forests to plantations as the primary source of wood, it is key for the Government of Uganda to embrace a paradigm shift on the current policy framework, to ensure that it facilitates rather than constrains the sawn wood value chain, since most of the timber will be sourced from privately owned forests instead of State-owned forests. If most legal provisions remain based on the latter, it is likely that legality will remain the exception rather than the norm.

Keywords: Uganda, informal timber sector, timber value chain, illegal logging

La filière du bois d'œuvre informel en Ouganda: structure et acteurs

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Avec la raréfaction et la dispersion spatiale des ressources forestières, le secteur forestier ougandais – à l'instar de plusieurs autres pays d'Afrique subsaharienne – est passé du modèle concessionnaire à grande échelle utilisé historiquement pour accéder et exploiter les forêts, à des modèles plus polyvalents impliquant des opérateurs travaillant à une échelle plus petite. Le bois qu'ils produisent est vendu non seulement localement, mais aussi au-delà des frontières nationales. Ces opérateurs travaillent largement en dehors des cadres réglementaires établis et, en tant que tels, restent invisibles aux statistiques nationales et internationales de production et de commerce, ce qui les rend aussi sans voix lors des processus de réforme des politiques. L'Ouganda ne fait pas exception, et on connaît mal la nature des personnes impliquées dans diverses

activités forestières à petite échelle, les contraintes auxquelles elles sont confrontées dans les opérations quotidiennes et la dynamique qui influence ces aspects. À travers 452 entretiens choisis dans un échantillon aléatoire d'acteurs impliqués directement dans la filière, menés entre 2016 et 2019, cet article décrit les flux de bois d'œuvre des zones de production vers les marchés en Ouganda. L'article évalue les caractéristiques socio-économiques des opérateurs et l'organisation des activités. Les résultats indiquent que la majorité des acteurs de la filière sont des hommes adultes, appartenant à un nombre limité de groupes ethniques, exogènes aux zones d'exploitation et tirant généralement leurs revenus du commerce du bois. La filière présente un degré élevé de fragmentation, avec de faibles niveaux d'organisation et un manque d'intégration tant verticale qu'horizontale. Nous estimons les volumes totaux vendus annuellement entre 386 000 et 467 000 mètres cubes de bois scié. Avec le passage progressif attendu, des forêts naturelles aux plantations comme principale source de bois en Ouganda, il est essentiel que le gouvernement ougandais adopte un changement de paradigme dans le cadre politique actuel, afin d'assurer des facilitations plutôt que des blocages pour le développement de la filière, puisque la plupart du bois proviendra de forêts privées au lieu de forêts appartenant à l'État. Si la plupart des dispositions légales restent fondées sur ces dernières, il est probable que la légalité restera l'exception plutôt que la norme.

Las cadenas de valor informales de la madera de aserrío en Uganda: estructura y actores

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Con la creciente escasez y dispersión espacial de los recursos arbóreos, el sector forestal de Uganda, al igual que varios otros países del África subsahariana, ha experimentado un cambio del modelo de concesión a gran escala utilizado históricamente para acceder a los bosques y aprovecharlos, a modelos más versátiles en los que participan operadores de menor escala. La madera que producen se vende no sólo a nivel local en los países productores, sino también al extranjero. Sin embargo, los pequeños operadores trabajan en gran medida al margen de los marcos normativos establecidos y, como tales, permanecen invisibles en las estadísticas nacionales e internacionales de producción y comercio, lo que hace que estos actores no tengan voz en los procesos de reforma de las políticas. Uganda no es una excepción, por lo que se sabe poco sobre la naturaleza de quienes participan en las diversas actividades forestales a pequeña escala, las limitaciones a las que se enfrentan en las operaciones diarias y las dinámicas que influyen en estos aspectos. Este documento describe los flujos de madera de aserrío desde las zonas de producción hasta los mercados en Uganda, como resultado de 452 entrevistas realizadas entre 2016 y 2019 a una muestra aleatoria de actores involucrados directamente en la cadena de valor de la madera de aserrío. En él se evalúan las características socioeconómicas de los operadores y la organización de las actividades. Los resultados indican que la mayoría de los actores de la cadena de valor informal de la madera de aserrío son hombres adultos, pertenecientes a un número limitado de grupos étnicos, exógenos a las zonas de tala y que generalmente obtienen sus ingresos del negocio de la madera. La cadena de valor de la madera de aserrío presenta un alto grado de fragmentación, con niveles de organización bajos y una falta de integración vertical y horizontal. En el artículo se estima, de forma conservadora, que los volúmenes totales vendidos anualmente de madera de aserrío están entre 386.000 y 467.000 metros cúbicos. Con el cambio progresivo que se espera de los bosques naturales a las plantaciones como fuente primaria de madera, es fundamental que el gobierno de Uganda adopte un cambio paradigmático en el marco político actual, para garantizar que se facilita, en lugar de limitar, la cadena de valor de la madera de aserrío, ya que la mayor parte de la madera procederá de bosques de propiedad privada, en lugar de bosques de propiedad estatal. Si la mayoría de las disposiciones legales siguen basándose en esto último, es probable que la legalidad siga siendo la excepción y no la norma.

INTRODUCTION

Domestic and regional demand for sawn wood in many tropical countries is increasing rapidly, due to demographic growth, urbanisation, improvement in economic conditions and standards of living (Cerutti *et al.* 2015, Hermans-Neumann *et al.* 2016, Schaafsma *et al.* 2014). In many countries and regions, including in East Africa and particularly Uganda, which is the focus of this paper, the growing demand for sawn wood is placing increasing pressure on available forest resources. This tends to result in unsustainable extraction rates that have led to overharvesting and degradation of existing forest reserves across the region, resulting in their continued decline (MWE 2016, Held *et al.* 2017, Ototo and Vlosky 2018). This has been amplified by illicit trade in sawn wood from forest-rich countries in the region such as Democratic Republic of the Congo (DRC) and South Sudan which increasingly transits through countries such as Uganda to other countries in the region (WWF 2012a, WWF 2012b).

With increasing spatial fragmentation and scarcity of forest resources, the large-scale concessionary model historically

used to access and harvest forests has increasingly given way to alternative models involving smaller-scale operators. In sub-Saharan Africa and beyond, such operators have in recent years emerged as a dominant group across various nodes in the sawn wood value chain; ranging from harvesting and processing to sawn wood retailing and wholesaling (Putzel *et al.* 2014, Cerutti *et al.* 2014, Wit *et al.* 2010). Yet, while the legal frameworks of many countries acknowledge such operators, rules and regulations remain strongly biased in favour of large-scale concessions. Most small-scale operators consequently are forced to conduct their activities illegally or informally (Tacconi *et al.* 2016). This, in turn, often renders such operators invisible to national and international production and trade statistics (Cerutti *et al.* 2017), and smallholder interests are poorly represented within policy dialogues and reform processes (Cerutti *et al.* 2015).

The latter is of particular concern, as the lack of policy consideration towards small-scale forestry operators in sub-Saharan Africa results in inadequately regulated and criminalised sectors that are widely associated with socio-economically

and environmentally detrimental practices, loss in government revenues and corruption. This buttresses poor governance and undermines national sustainable development objectives (Brack 2012, Pacheco *et al.* 2016). While this is often tackled by national policymakers as a domestic issue, part of the sawn wood produced by small-scale loggers is in fact traded across State borders, into regional and international markets (Lukumbuzya and Sianga 2017). This is particularly true of the East African region, where there is a pronounced and growing distinction between countries with significant wood resources available for harvesting in natural production forests (e.g. the Eastern Democratic Republic of Congo or South-Sudan) and net importers with few natural production forests left (e.g. Uganda and Kenya, Teucher *et al.* 2020).

Whereas Uganda and other countries in the Great Lakes region acknowledge the need to better regulate timber production and trade practices, there is paucity of critical information on value chain dynamics and governance due to its informal nature. Moreover, there are differences in the nature of logging operations across the region. In countries such as Democratic Republic of Congo, where large-scale logging concessionaires work alongside smaller operators, it is possible to explicitly identify and document operations of the latter. However, in other countries, such as Uganda, most of the sawn wood is produced by small-scale operators, mainly operating outside the purview of the State. Thus the distinction between formal and informal operations tend to get blurred, making it difficult to assess their real socio-economic impacts (Turyahabwe *et al.* 2015). This undermines the potential of the forest sector to contribute to the economic, social and environmental objectives of the country (MWE 2016). Generally, little is known about the range of actors involved, the functioning of the chain through which they operate, and the constraints they face in their day-to-day operations (e.g., with respect to corruption, efficiency and profitability).

Seeing how most actors engaged in small-scale logging, trading, and processing face structural barriers to formalization due to capacity and resource constraints, pervasive corruption, convoluted licensing procedures, and legal pluralism (Cerutti *et al.* 2015), a better understanding of such issues is pivotal to more effective forest policymaking. Even well-intended initiatives to address illegality could lead to extensive negative social impacts, such as marginalisation or exclusion of a significant proportion of the working force from economic sectors integrating to rural livelihoods. Effectively leveraging rising demand for sawn wood for sustainable and inclusive development purposes, requires that such initiatives expressly account for and respond to upgrading barriers confronting the sector.

This paper seeks to contribute to existing knowledge and to stimulate policy debate on informal sawn wood production and trade by examining the socio-economic characteristics of different actors across the Uganda sawn wood value chain, the types of activities they engage in, their organisational structures, and barriers they face. The findings are specific to Uganda. Yet, they are highly pertinent to ongoing local, regional and international policy processes that aim to formalize

and reduce the deleterious effects of the sector. Findings are particularly relevant to current efforts to develop integrated and regionally coherent timber resource management policies in the EAC region, as well as internationally coordinated efforts to tackle illegal logging. Ultimately, findings help design interventions within the forest sector that safeguard and augment small-scale producers dependent on the sector, while also enabling improved forest management and more responsible and efficient use of forest resources.

The following sets of research questions were used to guide the analysis: (i) what are the socioeconomic characteristics of actors engaged in the informal sawn wood value chain in Uganda? How do socioeconomic attributes influence their positioning within the value chain? (ii) How are activities organised in the informal sawn wood value chain? What is the association between patterns of vertical and horizontal integration and primary activity in the sawn wood value chain? (iii) What constraints do different actors along the sawn wood value chain in Uganda face? How node-specific are these constraints?

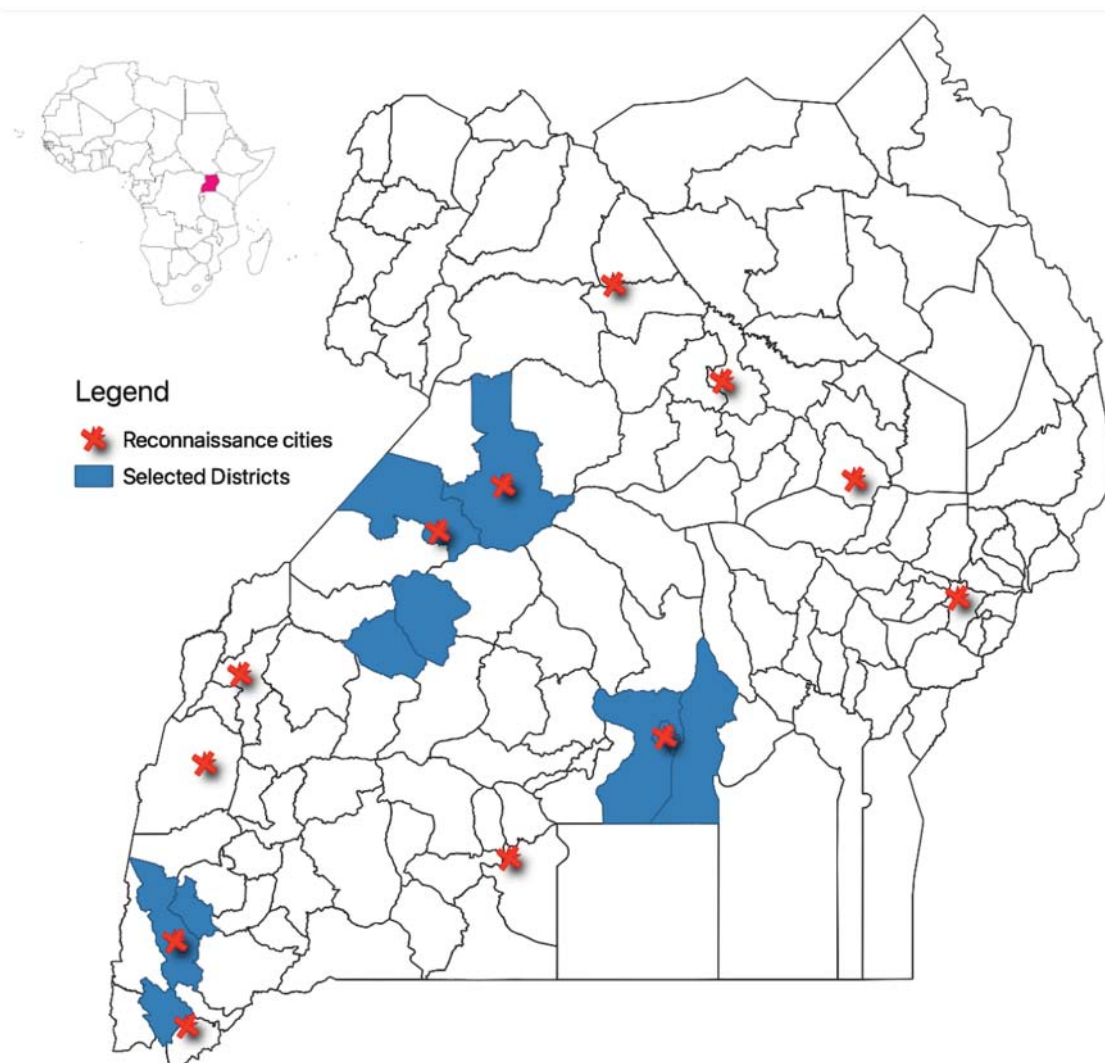
METHODS

Study area

The study was conducted between mid-2016 and mid-2019. It commenced with a 1-month reconnaissance survey carried out across Uganda to identify patterns of sawn wood flows from production areas to end-markets. The reconnaissance survey interviewed 42 wholesalers/retailers across the country (Figure 1), identified through a snow-balling technique, with general questions about their activities in the sawn wood value chain, sawn wood sources origin and sawn wood destinations.

The reconnaissance survey helped identify key trade routes, as well as nationally significant production and consumption areas. Basing on this, the mid-western and south-western regions of Uganda were selected as timber supply source areas, while the more urbanized central region was identified as the primary end markets. Specifically, we interviewed actors from the timber producing districts of Rukungiri, Mitooma and Rubanda in south-western Uganda and the districts of Kakumiro, Kibaale, Hoima and Masindi in mid-western Uganda. All these districts are located in the Albertine region of Uganda, which is the country's leading biodiversity hotspot (Plumptre *et al.* 2007). While production is highly concentrated, the reconnaissance survey shows that sawn wood retail and wholesale markets are scattered across the country. Nevertheless, the vast majority of sawn wood is in the central region, particularly Kampala and nearby towns located in adjoining Wakiso and Mukono districts, with an estimated population of 5.3 million people (UBOS 2020). Thus, actors sampled from sawn wood demand destinations were selected from these locations (Figure 1).

In mid-western Uganda, timber largely originates from tropical natural forests and a few scattered small-scale plantations of exotic species such as eucalyptus and pine.

FIGURE 1 *A map of districts of Uganda showing location of study area*

Timber is generally sourced from private land with absent landlords, government public land and communally owned land. In accordance with historical traditions and legacies of gendered customary rights, women barely own land but have rights of access and use to land and to trees and forests, although mainly for domestic purposes. Timber is mostly harvested from natural forests on private land, scattered trees on farmlands and illegally from government managed Central Forest Reserves. Kampala, the capital city of Uganda, and adjacent districts of Wakiso and Mukono, form the main market for sawn wood produced in the area. Only a small part of the harvested timber is also consumed locally and in the surrounding districts.

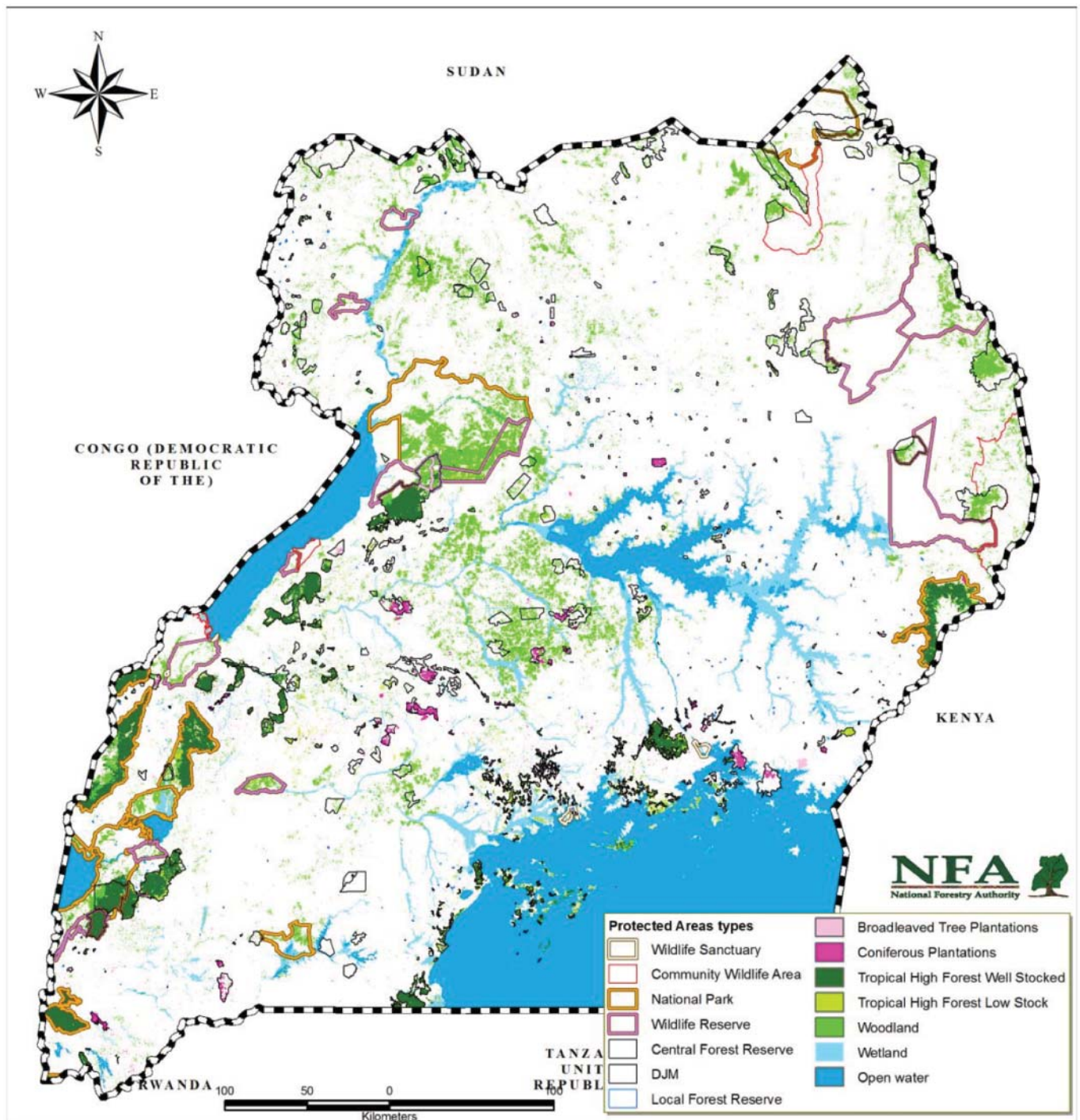
Land in the selected districts in south-western Uganda largely comprises private freeholds that are acquired through inheritance or commercial land markets. Plot size has steadily reduced over time due to land fragmentation, currently standing at an average of $\frac{1}{4}$ acre per household. Hence, most people do not have enough land to integrate agroforestry systems into the same plot. Most of the forest resources in sampled areas are planted and contained within these freeholds by – typically better resourced – farmers that transitioned out of

crop farming. Government does however retain rights over trees within these plantations, as those contained within the districts' natural forest managed as central and local forest reserves. While the lion's share of timber is sourced from private plantations, some timber is sourced from government plantations and high-value species illegally from government natural forests. As is the case for the mid-western region, Kampala city is the main market, with a small proportion retaining locally for local consumption.

Data collection

While our analysis in the next section of annual domestic sawn wood consumption is an important feature of this research, our research methods were mainly concerned with the socio-economic characteristics of operators and tracing the dynamics along the value chain. Consumption information collected by the two independent teams (reconnaissance and follow-up surveys) from different retailers in different markets and cities, also provides new insights into the national economic significance of the sector. Among other questions, the reconnaissance survey asked retailers about the number of

FIGURE 2 Forest cover and protected areas in Uganda (National Forestry Authority, Ministry of Water and Environment, 2015)



sawn products (e.g. planks, beams, with their individual dimensions and price) they would sell in an average week or month, while the in-depth surveys asked retailers about the sawn products sold over a four month period (two previous months from interview date for easier recollection as well as the best and worst month within the previous year). Reconciling and extrapolating these results enables us to provide data-informed estimations.

For all categories of operators (Table 1) along the value chain who had been provisionally categorised, for purposes of sampling, as producers, transporters, intermediaries,

traders and wholesalers/retailers, a node-specific structured questionnaire was tested, validated, and administered.

In total, 410 interviews were held to characterise each operator type, the activities they engage in, the organisation of these activities and the constraints they face (Table 2).

In production areas, specific locations with active and ongoing sawn wood production operations were obtained from the District Forestry Officers of each study district, while local leaders helped identify producers. Within markets, operators were identified using market leaders. From each category of actors, respondents were randomly selected and interviewed.

TABLE 1 *Categories of operators*

Operators	Description of main activity
Producers	Engage directly in the conversion of standing trees to sawn wood
Brokers	Search out and/or organise sawn wood supply for other people in the value chain
Transporters	Engage in movement of sawn wood between locations
Traders	Buy and sell sawn wood but do not sell directly to final consumers
Retailers	Buy and sell sawn wood directly to final consumers

TABLE 2 *Distribution of respondents by primary activity and region*

Primary actor	Number (percentage) of actors by region			
	Central	South-western	Mid-western	Total
Producer	22 (17.5)	57 (45.2)	47 (37.3)	126 (30.7)
Broker	27 (64.3)	09 (21.4)	06 (14.3)	42 (10.2)
Transporter	30 (55.6)	06 (11.1)	18 (33.3)	54 (13.2)
Trader	19 (35.2)	11 (20.4)	24 (44.4)	54 (13.2)
Retailer	86 (64.2)	24 (17.9)	24 (17.9)	134 (32.7)
Total	184 (44.9)	107 (26.1)	119 (29.0)	410 (100)

Surveys were operator-centric and not set up to identify larger societal impacts. To capture these, focus group discussions (FGDs) with men, women and mixed youth groups (<35) were held in the targeted production districts. A total of 54 FGDs were held. The FGDs were structured around general questions on changes and trends in the availability and management of timber and other forest resources, socio-economic benefits associated with timber production, as well as potential negative social and environmental impacts. Facilitators were trained to specifically probe for potential socially differentiated perceptions and impacts.

As is generally the case when studying activities deemed informal and/or illegal by authorities, particular care was taken with requesting consent from interviewees and protecting their identities. This involved ensuring that (i) responses would be anonymous and delinked from names and locations; (ii) interview could be stopped at any time with any need for justification; (iii) no detailed data would be published by aggregating results at the group level.

Data analysis

The analysis consists of three components, namely the socio-economic characterisation, the organisation, and constraints of actors in the informal sawn wood value chain. In relation to the socioeconomic characterisation, data were summarised using percentages, and a multinomial logistic regression analysis used to examine whether socioeconomic variables influenced the types of activities actors are engaged in. The most relevant results derived from this analysis are integrated in the following section (Results and Discussion). Interested readers can see the detailed analysis in Appendix I, which explains the technical analysis in more details. Analysis of

actor organisation is largely based on descriptive statistics on patterns of vertical and horizontal integration. Analysis of vertical integration involved grouping actors into four clusters, including sole activity players who engage in a single activity, 'upstream actors', 'downstream actors', and 'integrated actors'. Upstream actors integrate activities in the upstream to midstream end of the value chain from production to trade, but do not engage in downstream activities such as retail; downstream actors integrate activities in the mid-to downstream end of the value chain from retail back to transportation but do not engage in production; the integrated category includes those who span the whole value chain from production to selling of sawn wood to the final consumers. Analysis of horizontal integration involved assessing extent of involvement in collective action schemes such as associations and cooperatives at node level. Cross-tabulation and Chi-Square tests were used to examine if there was significant association between patterns of business organisation and the relative importance of specific activities to the overall sawn wood enterprise. Constraints faced by actors were categorised into groups, and cross tabulation as well as Chi-square tests were used to explore whether these constraints were associated with the primary focus of the sawn wood enterprise.

RESULTS AND DISCUSSION

Who is involved in the informal sawn wood sector in Uganda?

In this section, a description of the socioeconomic characteristics of the actors is provided to paint the picture of a typical actor engaged in the informal sawn wood value chain in

Uganda. Operators were characterised based on gender, ethnicity, education, experience (number of years in primary activity), sawn wood dependence (what percentage of their income was derived from sawn wood), residence status, social burden (how many dependant family members were in the family i.e. below 18 years and above 65 years of age) and wealth endowment (how much wealth a family had using indicators such as nature of houses and land ownership) (Table 3).

Among interviewees, men represent the majority, while 'mature' respondents predominate (as opposed to youths and the elderly). However, while the percentage of actors in the mature category is similar among women and men, the odds of elderly women to young women (1 to 15) is much lower

TABLE 3 *Socioeconomic characteristics of actors (n = 410)*

Characteristic		Category	Percentage
Gender	Men (79%)	Youths (18–30 years)	15.1
		Mature (31–59 years)	81.8
		Elderly (≥ 60 years)	3.1
		Youths (18–30 years)	17.6
	Women (21%)	Mature (31–59 years)	81.2
		Elderly (≥ 60 years)	1.2
Ethnicity	Baganda		19.0
	Bakiga		33.2
	Banyankole		14.1
	Banyoro		19.8
	Others*		13.9
Education	Primary or below		46.6
	Secondary		41.2
	Tertiary or above		12.3
Experience (years)	< 5		16.0
	5–<10		44.1
	10–<20		33.7
	≥ 20		6.2
Residence**	Locals		6.5
	Residents		37.3
	Outsiders		56.2
Dependence	Average		72.0
	Light		18.6
Social Burden	Medium		78.2
	Heavy		3.2
Wealth Endowment	Low		42.0
	Medium		17.3
	Affluent		40.7

* Includes Bafumbira, Batooro, Lugbara, and Bakonjo.

** Locals work and reside in districts of birth; residents stay in district where they work but not born there; outsiders were neither born nor stay in district of work

than the odds of elderly men to youths (1 to 5). With respect to education of actors engaged in informal sawn wood value chains, about 88% of the respondents had not gone beyond the secondary level. The study identified few women participating in timber harvesting. While some younger women in the south-western region reported occasionally carrying logs in the absence of alternative livelihood options, female involvement in the value chain is mainly concentrated in trading and – to a limited but potentially increasing extent – brokering.

A total of 14 ethnic groups participating in the sawn wood value chain were identified, with the Bakiga representing the majority, corroborating previous research (Jagger *et al.* 2011). This may be because the first commercial timber plantations in Uganda were established in Kigezi region which is the cradle of this ethnic group (Byakagaba and Muhiirwe 2017). Thus, they acquired the knowledge and skills for sawn wood production earlier than other ethnic groups in Uganda, and have so far been able to maintain experiential advantages to engage in timber trade beyond their areas of origin, as is also suggested by the majority (56%) of operators being 'outsiders', i.e. operating in districts where they were not born and do not reside.

This has relevant social consequences in terms of local livelihoods, the distribution of wealth across various districts, and the attachment (or lack thereof) that individuals have to the geography where they work. Research by Jagger *et al.* (2011) indicates that labourers come from outside logging areas due to lack of expertise by locals to do the work, while the local population in areas where timber is harvested does not directly benefit from the value chain, except for money that is spent locally by workers (e.g. on food). This is in line with findings in other countries (e.g. see Bickel and Cerutti 2017, Phuc and Sikor 2006). Lack of local benefit capture could produce conflicts between the local and resident population and external value chain actors, especially when both sectors and practices are extractive. This demands careful consideration by local and national policy makers attempting to reduce inequities and prevent conflicts along the value chain.

The largest share (44%) of respondents indicated that they have been engaged in the timber business for between 5 to less than 10 years, though a relatively large number (34%) have also been engaged for up to 20 years. This – when also related to other findings – bears very relevant information for policy makers with ramifications extending well-beyond the forest sector. For example, professional education programmes may graduate skilled young operators who will clash with the reality on the ground as long-established operators largely from one ethnic group may constitute a heavy barrier to entry for prospective new entrants. Hence for policies to result in equitable, effective and positive social impacts, such details need consideration and should aim at integration through ad-hoc incentives.

On average, actors in the value chain derive most (72%) of their income from their sawn wood businesses, indicating that the sector is a major source of local livelihoods. Notably, about 15% of respondents indicated that they have no alternative income sources, having identified sawn wood as their

sole income generating activity. This is a common feature in many timber producing countries (Hansen *et al.* 2015, Tumusiime *et al.* 2011, Mukul *et al.* 2014), and – we argue – one of the most important determinants when it comes to successful policies. Indeed, it needs careful consideration. For example, policymakers seeking to better regulate the sector because of global environmental concerns – as it is the case in most Nationally Determined Contributions to the Paris Agreement – should first and foremost assess whether valid alternative options are available for people risking loss of livelihood as a result of overly stringent and technocratic regulation or being forced into further illegality/criminality.

In terms of the potential social impacts of environmentally inspired policies, analysis sought to check how dependence on sawn wood varies between social burden categories. Results indicate that operators with heavy or medium household labour burden (family size of at least seven, at least 3 dependents, household head, and married or widowed) experienced greater dependency on the sector (73–79%) compared to those with a lower burden (69%). On the other hand, actors in the high wealth endowment category (houses have walls of burnt bricks, roofed with coloured corrugated iron sheets and tiled floors, plus substantial rural land holding) had a higher dependence (79%) compared to the other categories.

All in all, the analysis of patterns of involvement along the value chain indicates that downstream activities (e.g., retailing and wholesaling) are dominated by more youthful individuals that are new entrants in the sawn wood chain, who do not entirely depend on sawn wood as a source of income, and are residents in their areas of operation. This can be attributed to the fact that brokering as well as retail can be carried out with limited financial resources, but require adequate social networks, thereby privileging players with stronger local roots. On the other hand, transporting of timber in Uganda has several formal and informal costs that one has to pay upfront, and this may make it less attractive.

How much timber is potentially sold?

National statistics are wanting when it comes to the official estimates of timber production and consumption. In 2012, the quantity of timber produced domestically (i.e., excluding imports from neighbouring Democratic Republic of Congo or South-Sudan) was estimated at about 360,000 cubic meters of sawn wood, or about 1.4 million cubic meters roundwood-equivalent with a processing rate of about 25% (WWF 2012a). The authors clearly indicated that their findings were “informed estimates” (WWF 2012a, p.6). FAOSTAT production data report the same value from 2015 to 2019, at 440,000 cubic meters for sawn wood and about 1.7 million cubic meters of round wood (based on imputation methodology, <http://www.fao.org/faostat/en/#data/FO>).

This assessment focussed more on the socio-economic dynamics along the timber value chain, than with a detailed quantification of produced and sold volumes. We believe regulatory improvements to the forestry sector in Uganda could stem more from a better understanding – and indeed

acknowledgement – by policy makers about who does what and for what reasons, than from an exact quantification of traded volumes. That notwithstanding, collected data do allow us to provide informed estimates about timber volumes sold on the market, which seem to indicate a growing trend as compared to previous estimates.

Overall, surveyed retailers provided length, width, and height of about 2 million pieces sold from 34 species, of which about 50% eucalyptus (*Eucalyptus spp.*), and about 21% pine (*Pinus spp.*). The vast majority of pieces can be categorised as planks, with a general length of 2.5 meters, width of 10–15 centimetres, and height 5 centimetres. The average volume of such piece is about 0.02 cubic meters. Findings indicate that most *Pinus spp.* and *Eucalyptus spp.* Are sourced from private and government plantations located in South Western Uganda in the districts of Rukungiri, Mitooma and Rubanda. Less than 30% of the timber was made of high value traditional hardwoods (mainly *Milicia excelsa* and various species sold as mahogany), low value hardwoods (mainly *Antiaris toxicaria*, *Polyscovia fulva* and *Canarium schweinfurthii*) and medium value hardwoods (including *Lovoa trichiliodes*, *Maesopsis eminii*, *Piptadeniastrum africana*, *Warburgia ugandanensis*, *Pynanthus angolensis*, *Funtumia africana*, *Markhamia lutea*, *Blighia unijugata* and *Albizia Coriaria*). These timbers were sourced mainly from natural forests on private land, government forest reserves and scattered trees on farm in mid-western Uganda in the districts of Kakumiro, Kibaale, Hoima and Masindi.

Interviewed retailers during the reconnaissance survey indicated an average of about 1,800 planks sold per month, or about 31 cubic meters. The in-depth survey resulted in an average of about 38 cubic meters per month. The reconnaissance survey across the 13 cities and surrounding areas indicated a total number of about 1,700 sheds, of which more than 1,000 found in Kampala and neighbouring areas (e.g., Wakiso). Results also show that about 80% of all recorded sales are destined to these markets (Kampala and Wakiso in particular), while about 97% of the volumes sourced by sheds in Kampala and Wakiso are coming from other districts (in particular Kabale, Kalangala, Rubanda, Rukungiri, Masaka, and Masindi).

The above considerations are important because double-counting when estimating national consumption can be an issue. For example, a plank can be recorded as ‘sold’ from one shed in, say, Kabale, then bought by one shed in Kampala, and then recorded again as ‘sold’ by the latter to the final user of the plank. Hence, for this assessment we consider that volumes sold and recorded in Kampala and neighbouring areas can be used as a good proxy for the total volumes sold on the national territory. All in all, the total volumes sold annually in these areas vary from between 386,000 and 467,000 cubic meters. This is based on extrapolating average quantities sold by market in these areas to the total number of sheds per market. We account for seasonality, by taking the average of the total volume sold during the rainy/low season and the total volume sold during the dry/high season. This is very likely a gross underestimate since our analysis does not

capture direct sales (e.g., sales bypassing timber markets), indicating – if need be – that consumption has grown in recent years and that a clear policy decision should be taken as soon as possible to monitor at least the basic trends in production and consumption across the country.

How do informal sawn wood trade operators do business?

The majority (75%) of sampled actors engage in a sole activity, with mid-stream activities (brokerage and transport) almost entirely engaged in by single activity actors (Table 4).

This means that at least one in four sampled operators engage in some form of vertical integration. This seems to be a distinctive feature of the Ugandan informal timber sector as compared to the formal one, where vertical integration is a common practice owing to the advantages it offers such as improving procurement security and capturing profit margin along the chain (Held *et al.* 2010). This can be attributed to challenges inherent to small-scale operations. The upstream integration pattern (e.g., production and trading) is relatively more frequent than the other integration patterns while the downstream integration pattern is the least common. Interestingly, those that are more fully integrated are rarely involved in trading and transportation, indicating that this category may be dominated by producers who sell directly to consumers within the locality of production.

Integrated strategies are adopted almost exclusively by men. Despite reportedly higher profits associated with such models, women traders report preferring procuring and selling timber at the market in order to avoid risky and time-consuming activities associated with timber production. In the mid-western cluster, female traders often work with their spouse. In some instances, this is reported to allowing male-spouses to focus on production activities while female-spouses manage sales. Overall, female traders were observed to operate with smaller sawn wood stocks and often relying on male associates when dealing with law enforcement agents.

Overall, the informal timber business is fragmented, with low levels of vertical integration. This can be attributed to the lack of process and product standards demanded downstream, as well as to the informal and criminalized nature of the sector, which in turn hampers the discussion and adoption of streamlined and coherent regulations providing incentives and opportunities for a coordinated approach to production, processing and selling. Rather, the chain, as expected, resembles traditional market governance, characterized by an absence

of standards and high levels of fragmentation both up- and downstream. Horizontal coordination with other operators in the value chain is uncommon with only 25% of respondents indicating that they had any form of collaboration with actors engaged in similar activities as theirs. When it does exist, coordination relates to both core and non-core activities. The former include activities that are specific to the sawn wood value chain such as tree planting, harvesting, transportation, processing, and marketing of sawn wood. This type of coordination includes joint performance of activities and labour pooling in order to capitalize on scale efficiencies. The latter include activities such as joint savings or social support for private activities not directly related to the sawn wood value chain (e.g., see Chevallier and du Preez 2012).

The reasons for weak horizontal coordination include limited opportunities due to lack of groups (e.g., cooperatives, associations) to join, the mobile nature of the business, or the excessive membership fees when groups do exist, but also negative perceptions – notably among traders – such as lack of interest, mistrust, and ethnic divisions. While indeed there were barriers to collective action initiatives, the limited number of people participating in any form of cooperation may have also been exacerbated by the fact that most of the trade is informal and criminalised by mainstream government law enforcement practices. Collective action initiatives are triggered by the existence of incentives from government for grouping of enterprises (Guillen 2000), and the current environment in Uganda is not conducive to this.

Yet, we argue, a more proactive stance is needed on both sides – government and operators – to start discussions aimed at improving the current situation. Incentivising coordination may bring social benefits to operators (e.g., job security, bargaining power), financial benefits (e.g., more sustainable profits and increased revenues), and environmental benefits to all (e.g. better planning of harvesting operations and replanting schemes), in addition to decreasing the number of operations and operators working outside the law by spreading legal compliance costs. Importantly, given for instance women's lesser engagement in vertical integration as well as their dependence on male relatives and associates for dealing with authorities, such efforts must seriously consider various social, economic and cultural constraints in order to avoid further marginalizing less connected and competitive value chain actors (see e.g., Ribot 1998 and Smith *et al.* 2018).

The latter point is particularly important as results indicate that, when it comes to the legality of traded products, the most common *modus operandi* in the sector is 'don't ask, don't

TABLE 4 *Patterns of vertical integration in the sawn wood value chain*

Activity pattern	Frequency (percentages) by primary activity					
	Produce	Broker	Transport	Trade	Retail	Total
Sole activity	82 (65.1)	41 (97.6)	53 (98.1)	28 (51.9)	102 (76.2)	306 (74.6)
Upstream	25 (19.8)	-	1 (1.9)	18 (33.3)	-	44 (10.7)
Downstream	-	1 (2.4)	-	8 (14.8)	16 (11.9)	25 (6.1)
Integrated	19 (15.1)	-	-	-	16 (11.9)	35 (8.5)
Overall	126 (30.7)	42 (10.2)	54 (13.2)	54 (13.2)	134 (32.7)	410

tell'. On average, sampled operators reported that most of the sawn wood (60%) that they dealt with in their businesses is legal (i.e., it conforms to established rules and regulations), with producers indicating the lowest proportion (54%). Obviously, producers are key here. If the timber is accessed and harvested illegally, it can then be sold down the chain without other operators knowing, hence dealing with it as if it were a legal product. This is further reinforced by the finding that on average 15% of sampled operators (with the lowest value at 10% for wholesalers/retailers) report customers demanding for legal sawn wood or paperwork attesting to the legality of the product traded or bought.

While these results are based on estimations of actors about the volumes of legal sawn wood through their businesses as opposed to hard assessment of paperwork, they still clearly indicate not only that there are serious problems with the legality of the timber value chain in Uganda, but also that such problems are persistent throughout the years, as research conducted almost a decade ago indicated that most sawn wood marketed in Uganda was illegal as official procedures and regulations were rarely followed (WWF 2012a, 2012b).

What constraints do different actors along the sawn wood value chain face?

The key challenges faced by sawn wood value chain actors include the high cost of doing business, poor road infrastructure, timber scarcity and poor quality of timber, as well as business environment risks. Key issues identified under high cost of doing business include expensive licenses and high taxes, the high cost of transportation, and high cost of borrowed capital. Poor road infrastructure relates to impassable roads in rural areas, particularly during the rain seasons. The issues identified under resource waste, scarcity and poor quality include harvesting of immature trees which yields poor quality timber, reduced availability of trees (hence timber) and under-sizing of the timber.

Business environment risks and weaknesses faced by timber producers include bad debts and delayed payments arising from credit customers, high competition for the few customers, corruption, theft, unreliable workers, fire hazards and the unregistered brokers. Regulatory challenges include harsh enforcement personnel, unclear requirements, bureaucracy necessary to formally harvest trees even from privately owned plantations, and illegality of chainsaw use.

The regulatory framework governing the production and trade in forest produce includes the Uganda National Forest Policy (2001), the National Forestry and Tree Planting Act (2003), the Statutory instrument No.16 (forest produce fees and license order) 2000, the Ministerial Notice (2004) banning chain saw use in sawn wood processing, the legal timber trade guidelines (2014), Value Added Tax Act Cap 349 (1996) as Amended, PPDA Act-2003, the National Forestry and Tree Planting Regulations (2016), and Chain of Custody Procedures (UNBS 2019). The many restrictive provisions in these regulatory instruments, while well-intentioned, do provide the ground for non-compliance as the administrative burden required for their observance is overarching for both, the regulators and the regulated.

Consequently, most of the timber on the market is produced in contravention of these legal instruments and as such is classified as informal and/or illegal. According to WWF (2012), the reasons explaining why over 80% of sawn wood in Uganda is produced and traded illegally include inconsistent regulation, inadequate law enforcement, dysfunctional systems of tracking of timber, tax evasions and uncoordinated institutional responses. Yet, little has changed on the policy side over the past decade. This can partly explain why most of the harvesting and trade is still done either in legally grey areas (e.g., it remains illegal to use chainsaws to harvest trees but not to process timber), or tout-court illegally, with operators complaining almost unanimously about regulatory procedures which are too expensive, too complex, and enforced through aggressive and militaristic approaches, with no efforts paid towards improving rules and regulations applied to their operations.

Given the high level of fragmentation both up and downstream and the potential benefits of more explicit coordination, more emphasis should be placed on improving collective organization; for example, by promoting and incentivizing cooperative enterprises. This will furthermore enable policy-makers and regulators to reduce transaction costs associated with enforcing formal rules and enable small-scale producer interests to be more equitable represented in policy dialogues and reforms.

CONCLUSION

This paper addressed several knowledge gaps on the formal-informal continuum found along the sawn wood value chain in Uganda. Results point to a very fragmented value chain, where neither vertical nor horizontal integration are mainstream. Yet urbanisation and demographic growth have pushed demand up over the years, and while the scale of single operations remains generally small, their growing number is currently able to satisfy a very conservative annual consumption of between 386,000 and 467,000 cubic meters of sawn wood.

Overall, we argue the current policy framework is neither adapted nor ready for the value chain to become an engine of growth in terms of socially fair and environmentally sustainable local livelihoods, green businesses, and State revenues. This is possibly the result of long-term neglect and criminalisation by the Government of Uganda, and poor consideration to social dynamics, which also contribute to maintain a large number of production and trade operations in the informal or tout-court illegal realm.

As Uganda has in recent years started putting on the market timber sourced from its industrial plantations, it is of the utmost importance to adopt improved and 'do-no-harm' policies vis-à-vis the large number of currently informal operators and their families described in this paper. This does not mean that policy reforms are a panacea to the challenge of informal sawn wood production and trade, as any sector reform process will create new winners and losers. Yet they remain a very important step indicating that the sector is acknowledged, discussed and legislated by the Government

of Uganda, instead of brushed under the carpet of a ban which remains, as we have shown, largely unenforced.

The expected progressive shift from natural forests to plantations as the primary source of wood, has policy implications with regard to privately grown plantations requiring lengthy regulatory procedures to be formally harvested. This points to the need for a paradigm shift on the regulatory framework to ensure that it facilitates rather than constrains the sawn wood value chain, since most of the timber is expected to be sourced from privately owned forests instead of State-owned forests. In fact, if most legal provisions remain based on the latter, there is not much hope that legality in the forestry sector will become the norm instead of the exception. In addition, findings also indicate that potential trade-offs between the expansion of plantations and local food production and security must be considered carefully.

Although addressing all these issues at once might seem complex, maintaining the status-quo – as it has been for decades on the banned use of chainsaws – is not a good option either. Policy discussions including concerned and relevant operators should start in earnest, as demand and consumption will continue to rise in the coming years.

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APPENDIX I

A multinomial logistic regression analysis (Equation 1) was used to examine whether socioeconomic variables influenced primary activity engaged in. (Equation 1)

$$\ln\left(\frac{p(\pi_j)}{p(\pi_q)}\right) = \beta_{jo} + \sum_{i=1}^k \beta_{ji}x_i \text{ for } j = 1, \dots, q-1 \quad (1)$$

Where p denotes probability, π_j are the categories of the dependent variable (π_q being the reference category), β_{ji} are logistic constants (β_{jo} being intercepts), x_i are the explanatory variables (numbering k), $\ln$ is the natural logarithm. Primary activity engaged-in was the dependent variable (categories: 'produce', 'broker', 'transport', 'trade' and 'retail' with 'produce' as the reference category) while socioeconomic variables were the independent variables. For all categorical independent variables the dominant category was used as the reference group.

Relationship between primary activity and socioeconomic characteristics

Unsurprisingly, analysis of patterns of involvement along the value chain indicates that majority of actors sampled were engaged in the sawn wood business as producers or wholesalers/retailers, which are the upstream and downstream ends of the sawn wood value chain respectively (Table 4).

The multinomial logistic regression model makes adequate prediction compared to the null model ($X^2 = 329$, $df = 64$, $p = 0.00$) and explains about 59% of observed variations in the data. With exception of sex of respondents, all socioeconomic variables included in the model have significant influence on the primary activity engaged-in by actors in the informal sawn wood value chain (Table 4). Overall, the model correctly classifies 58% of actors; with exception of traders (12%), all categories are fairly correctly classified (44%–74%).

The insignificance of sex as a determinant of primary activity engaged-in can be attributed to the dominance of men over women in all nodes of the chain ranging between 74% and 90% except for the retail node where women represent 33% of actors sampled. This is the only node where sex influences the odds of participation compared to the production node.

Similarly, dependence influences participation in the transport node while education influences participation in the retail node. The odds of being a transporter compared to a producer decrease with increased dependence on sawn wood for income, indicating that actors who derive a high proportion of their income from sawn wood are less likely to engage in transport as a primary activity compared to production. Similarly, having a secondary level of education increases the odds of participation in the retail node compared to production, indicating that actors with a secondary level of

TABLE 5 *Patterns of involvement in various stages of the sawn wood value chain*

Activity Rank	Frequency (percentage) by activity				
	Production	Brokerage	Transport	Trade	Retail
Primary	131 (81.4)	42 (68.9)	54 (84.4)	53 (58.2)	130 (82.3)
Secondary	28 (17.4)	19 (31.1)	6 (9.4)	36 (39.6)	26 (16.5)
Tertiary	2 (1.2)	-	4 (6.2)	2 (2.2)	2 (1.2)
Overall	161	60	64	91	158

TABLE 6 *Likelihood ratio tests for independent variables*

Effect	-2 log likelihood	X^2	df	p
Intercept	854.2	0	0	-
Timber income dependence	864.8	10.6	4	0.03
Years in primary activity	887.6	33.4	4	0.00
Age	888.3	34.2	4	0.00
Sex	862.4	8.2	4	0.08
Ethnic group	892.8	38.6	16	0.00
Social burden	887.5	33.3	8	0.00
Wealth endowment	879.2	25.0	8	0.00
Residence category	903.5	49.4	8	0.00
Education level	880.3	26.1	8	0.00

education (compared to primary and below) are more likely to participate in the retail link than in the production link.

Experience reduces the odds of participation in intermediation, transport and the retail nodes as a primary activities compared to production, indicating that actors participating in those nodes have less experience in the sawn wood commodity chain than those who are primarily producers.

Similarly, age reduces the odds of participation in intermediation and the transport node as a primary activities compared to production, indicating that compared to producers, brokers and transporters are more likely to be younger. On the other hand, facing a light (compared to medium) social burden increase the odds of doing intermediation and participation in the retail nodes as a primary activities compared to production, indicating that actors facing a light burden are more likely to engage in intermediation or retail than in production.

Residence status (local or resident compared to outsiders) increase the odds of doing intermediation, and participation in the transport and retail nodes as a primary activities compared to production. Thus compared to producers, brokers as well as wholesalers/retailers are less likely to be outsiders. Similarly, ethnicity influences participation in all nodes of the informal

sawn wood commodity chain, except the role of intermediation, increasing or decreasing the odds of participation depending on node and ethnicity. Compared to the production node, belonging to the Banyoro ethnic group increases odds of participation in the transport and wholesale nodes. On the other hand, belonging to the Banyankole or 'others' ethnic groups reduces the odds of participation in the trade node compared to the production node. This can be attributed to an above average participation of the Bakiga and below average participation of the Banyoro, Banyankole and 'others' ethnic groups in these nodes. At 39% and 48% in the production and trade nodes respectively, participation of the Bakiga ethnic group in these nodes is higher than their overall participation in the chain at 33%.

Apparently, there is overlap between the production and trade node or the actors who engage in production and trade as primary activities have relatively similar socioeconomic characteristics. A cross-tabulation between these activities indicates that 25% of actors who are primarily producers also engage in trade while 33% of actors who are primarily traders also engage in production. Both nodes are dominated by the Bakiga ethnic group at participation levels above their overall average in the chain.

TABLE 7 Extract of parameter estimates for significant effects in the model

Activity*	Variable	β	SE	Wald	df	Sig.	Exp(β)
Intermediation	Intercept	5.23	1.58	10.96	1	0.01	-
	Experience	-0.23	0.07	12.02	1	0.00	0.79
	Age	-0.14	0.04	16.25	1	0.00	0.87
	Burden (Light)	2.96	1.34	4.91	1	0.03	19.35
	Residence (Locals)	2.77	1.22	5.15	1	0.02	16.01
	Residence (Residents)	2.90	0.74	15.42	1	0.00	18.20
Transport	Intercept	3.58	1.52	5.56	1	0.02	-
	Dependence	-0.02	0.01	5.08	1	0.02	0.98
	Experience	-0.25	0.06	19.53	1	0.00	0.78
	Age	-0.07	0.03	5.10	1	0.02	0.93
	Ethnicity (Banyoro)	1.54	0.57	7.33	1	0.01	4.67
	Residence (residents)	2.62	0.66	15.72	1	0.00	13.78
Trade	Ethnicity (Others)	-1.23	0.61	4.13	1	0.04	0.29
	Ethnicity (Banyankole)	-1.24	0.63	3.89	1	0.05	0.29
Wholesale/Retail	Experience	-0.08	0.03	7.22	1	0.01	0.93
	Sex (Women)	1.06	0.47	5.25	1	0.02	2.89
	Ethnicity (Others)	-1.25	0.57	4.88	1	0.03	0.29
	Ethnicity (Banyoro)	1.03	0.44	5.51	1	0.02	2.80
	Education (Secondary)	0.86	0.34	6.51	1	0.01	2.37
	Residence (Residents)	2.33	0.50	21.41	1	0.00	10.30
	Social Burden (Light)	1.80	0.53	11.33	1	0.01	6.03

* Primary activity (reference category = Produce)

Challenges to smallholder forestry policy reform on a post-industrial logging frontier: lessons from the Amazon estuary

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HIGHLIGHTS

- Effective forest policy reform in Amapá, Brazil has been impeded by bureaucratic inertia and failure to adapt norms to local realities and livelihood dynamics.
- Small-scale timber production and processing in the Amapá estuary remains informal despite State attempts to provide an accessible pathway to formalization.
- Smallholder timber production in the Amapá estuary has declined due to shifting emphasis on açaí production, reduced resource availability, difficulties formalizing forestry operations, and increased rules enforcement by environmental agencies.
- Timber is still an important livelihood for many families and mill owners that supply timber to local communities.
- Relaxed management guidelines for fast-growing timber species on the floodplain ultimately did not address the needs of smallholders.

SUMMARY

In 2013, policy makers from the Brazilian State of Amapá launched regulatory reforms intended to streamline options to formalize smallholder forest management. This paper reviews that policy reform process and analyses observations from local stakeholders to identify lessons for the promotion of smallholder forestry. In 2014, 2017 and 2021, interviews were conducted with family timber producers and sawmill operators in floodplain communities and regional timber buyers to evaluate the impact of the policy reform on their operations. Interviews with policy makers sought to understand the rationale behind the reform and how the process played out. Although the reform efforts were well intentioned, results illustrate how bureaucratic inertia and complexity obstructed efforts to simplify policy and how policy did not address smallholder needs. While the reforms did not have the intended effect, the case offers lessons for future policy reform efforts.

Keywords: forest policy reform, small-scale forestry, forest governance, Brazilian Amazon, Amapá

Défis rencontrés dans la réforme de politique de la foresterie des petits propriétaires sur une frontière post-industrielle: leçons de l'estuaire de l'Amazone

M. CROMBERG, P. CRONKLETON, M. MENTON et R.R. SEARS

En 2013, les créateurs de politique de l'état brésilien de l'Amapá ont lancé des réformes de régulation, visant à encadrer les options pour formaliser la gestion forestière des petites exploitations. Ce papier examine le processus de réformation de cette politique et analyse les observations des parties prenantes locales pour identifier les leçons pouvant être glanées dans la promotion de la foresterie des petites exploitations. En 2014, 2017 et 2021, des interviews ont été conduites auprès des familles des producteurs de bois et des opérateurs de scieries dans les communautés des plaines inondables, ainsi qu'auprès des acheteurs de bois régionaux, pour évaluer l'impact de la réforme politique sur leurs opérations. Des interviews de créateurs de politique ont cherché à comprendre le raisonnement sous-tendant la réforme et la manière dont le processus s'est opéré. Bien que les efforts de réforme aient été bien intentionnés, les résultats illustrent que les efforts vers une simplification de la politique ont été contrés par une inertie et une complexité bureaucratique, et que la politique ne répondait pas aux besoins de petits exploitants. Alors que les réformes n'ont pas connu l'effet attendu, le cas peut offrir des leçons à tirer pour les efforts futurs de réforme de politique.

Desafíos en la reforma de la política forestal para pequeños propietarios en una frontera de tala postindustrial: lecciones del estuario del Amazonas

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Los responsables políticos del estado brasileño de Amapá lanzaron en 2013 reformas normativas destinadas a agilizar las opciones para formalizar la gestión forestal de los pequeños propietarios. Este documento revisa ese proceso de reforma política y analiza las observaciones

de las partes interesadas locales con el fin de identificar lecciones para fomentar la silvicultura de pequeños propietarios. En 2014, 2017 y 2021, se realizaron entrevistas tanto a productores familiares de madera y operadores de aserraderos en las comunidades de las llanuras de inundación como a compradores regionales de madera para evaluar el impacto de la reforma política en sus operaciones. Las entrevistas con los responsables políticos trataron de comprender los motivos de la reforma y cómo se desarrolló el proceso. Aunque la reforma fue bien intencionada, los resultados ilustran cómo la inercia burocrática y la complejidad obstruyeron los esfuerzos para simplificar la política y cómo ésta no abordó las necesidades de los pequeños propietarios. Aunque las reformas no tuvieron el efecto deseado, el caso ofrece lecciones para futuras iniciativas de reforma política.

INTRODUCTION

Floodplain forests of the Amazon estuary comprise the oldest logging frontier in the Brazilian Amazon (Barros and Uhl 1995, Raffles 1999). Industrial extraction began in the mid-20th century when timber companies exploited high-value floodplain specialist species, processing them in large mills located in the Amapá State capital, Macapá (Barros and Uhl 1995, Pinedo-Vasquez *et al.* 2001). After several decades of intensive and unsustainable logging, the forests became depleted of industrial-grade commercial trees, and the mills began to close in the 1970s (Pinedo-Vasquez *et al.* 2001). As industries departed, smallholder families, many formerly employed by the industries, moved into the abandoned forests to homestead.

Some local families took over abandoned equipment to establish sawmills, using knowledge and skills gained while working for the timber companies (Sears *et al.* 2007). Timber was sourced from old fallows and remnant old-growth forest on or adjacent to their landholdings and those of neighbouring farmers. These family-run mills supplied local and regional markets (Pinedo-Vasquez *et al.* 2001). Motivated residents managed timber in earnest, particularly fast-growing pioneer species that regenerate naturally in their agricultural fallows, and protected or planted high-value species on their landholdings with an outlook to the future (Sears and Pinedo-Vasquez 2004).

This smallholder forestry system provided income to farming families and sustained the local mills until the mid-1990s, when estuarine farmers began to shift from annual crops and occasional timber sales to intensified production of açai fruit (*Euterpe oleracea* Mart.), a staple food in the region. The national and international markets for açai were booming (Brondízio 1999, Brondízio 2004, Brondízio *et al.* 1994). Açai palm is native to the estuarine floodplain forests and is easily managed in natural forests and agroforestry systems (Cavalcante 1991). Because of its high yield, insatiable market and low labour requirements, açai management quickly became a popular alternative to timber and annual cropping in the estuary, and estuarine farmers converted much of their mature forest fallows and remnant old-growth forests to açai stands, locally called *açaizais* (Fortini and Carter 2014, Weinstein and Moegenburg 2004). Nevertheless, local demand for lumber still motivates local forest management for timber today.

Virtually all small-scale timber production and transformation in the region has been informal, governed by well-organized local institutions (Menzies 2007, Rockwell *et al.*

2007, Zarin *et al.* 2007). A major barrier to legal operation has been the incompatibility of licensing procedures for timber harvest and transformation with the smallholder forestry and mill practices used locally (Menzies 2007, Vieira *et al.* 2014), a common situation world-wide (Holding Anyonge and Roshetko 2002, Mejía *et al.* 2015, Sears *et al.* 2021). Brazil's forest code requires technical management plans developed and supervised by licensed foresters through a highly bureaucratic procedure, all of which necessitates technical assistance and results in dependency on outside institutional and professional support. It has long been clear that regulatory reform based on local realities would be needed to provide a pathway to formality in this region (Fortini 2019).

Through a federal mandate for decentralization of public policy, State governments in Brazil gained the authority to adapt forest policy to better reflect State level conditions and goals (Rocha *et al.* 2020). In response, in 2012, the Amazonian State of Amapá initiated policy reforms intended to support the State's forestry sector, with a central focus on the promotion of smallholder forest-based livelihoods and natural resource management. Under the program *Pro-Extrativismo*, the State promoted four main commercial product chains: açai, timber, vines and Brazil nut. The cornerstone of the pro-timber strategy in the State forest policy initiative was Decree 3325, passed in 2013, which targeted the promotion of sustainable and legal timber production by rural landholders. This innovative decree recognized the distinct conditions of smallholders and communities managing forests in Amapá, which were overlooked by federal norms, and sought to simplify the rules for formalization.

This paper reports on forest policy reform in the State of Amapá, Brazil, and specifically on Decree 3325, which included as one of its goals the development of a regulatory pathway for the formalization of small-scale forestry. We focus our analysis on the reform's relevance in estuarine communities, which, due to their distinct hydrological condition, are governed by different land tenure rules, and as a result land tenure regularization in these areas has focused on recognition of communal property rights, while in upland areas private individual titling is more common. We review federal forest policy, the State forest policy development, and smallholder timber management systems in two communities of Amapá to analyse the rationale behind the reform and how the process played out. Research entailed policy analysis, on-site ethnography, and key informant interviews over seven years. In the end, the reform failed to create a simple pathway for smallholder timber producers to legalize their harvest as planners did not account for contradictory agendas in

governmental agencies; nor did they introduce options adapted to local livelihood dynamics. Lessons learned from this case can inform future efforts to support the formalization of forest-based livelihoods.

METHODS

This study combines policy analysis with semi-structured interviews with multiple stakeholders in the Amapá forestry sector and ethnographic fieldwork in selected floodplain communities from 2014 to 2021. Research was initiated in 2014 with interviews with key informants involved in policy design and implementation. Policy analysis was based on literature review and informant accounts, as well as a review of relevant reports and publications related to the reform provided by informants. In late 2014, fieldwork was carried out over three weeks to interview informants in rural communities and conduct follow-up interviews with key informants in government agencies in the State capital, Macapá. In 2017, a second round of interviews was undertaken in the field to assess the impact of the policy implementation. Subsequently, once fieldwork was completed in Amapá and authors were no longer in the region, follow-up telephone interviews were conducted in 2020 and 2021 with key informants from the communities and State agencies to track progress.

Study site

The focal area for this study is the estuarine region of the State of Amapá, in the Brazilian Amazon (Figure 1). Located on the flat northern land mass at the mouth of the Amazon River, the humid tropical forests and rural settlements near the coast of Amapá are subject to both seasonal and freshwater tidal flood pulse dynamics, which inundate farmland and forests alike twice daily. Smallholder farmers have practiced shifting cultivation in these floodplains with long fallows, forest management, fisheries management and animal husbandry (Brondízio *et al.* 1994).

Fieldwork focused on farmers in two settlements, Foz do Mazagão Velho and Anauerapucu, each formally registered as an Agro-extractivist Settlement Project or PAE (the Portuguese acronym for *Projeto Agroextrativista*). These two settlements were purposefully selected from the 21 PAEs in Amapá for their location on the estuary and prevalence of timber activity. Foz do Mazagão Velho (henceforth Foz), one of three PAEs in the municipality of Mazagão, previously had been prioritized by the Amapá government for rural development support and had been targeted by the State Forestry Institute (IEF) to formalize the timber supply chain. The PAE Anauerapucu was identified as a settlement where smallholders managed timber but did not receive forestry development assistance from the government. Foz was recognized as a PAE in 2012 and is located 50 km from the State capital city of Macapá. There are approximately 195 households dispersed

along rivers transecting the settlement. Anauerapucu was formalized as a PAE in 1998 and is located 27 km from Macapá in the municipality of Santana. There are 518 resident families distributed in five villages, most of which had occupied their homesteads long before the area became a PAE. Both settlements are connected to the nearby urban centres of Macapá and Santana by a State highway, but residents mainly depend on local waterways for transportation. The two cities are hubs for the trade of agricultural products and natural resources for local markets and for export.

Data collection

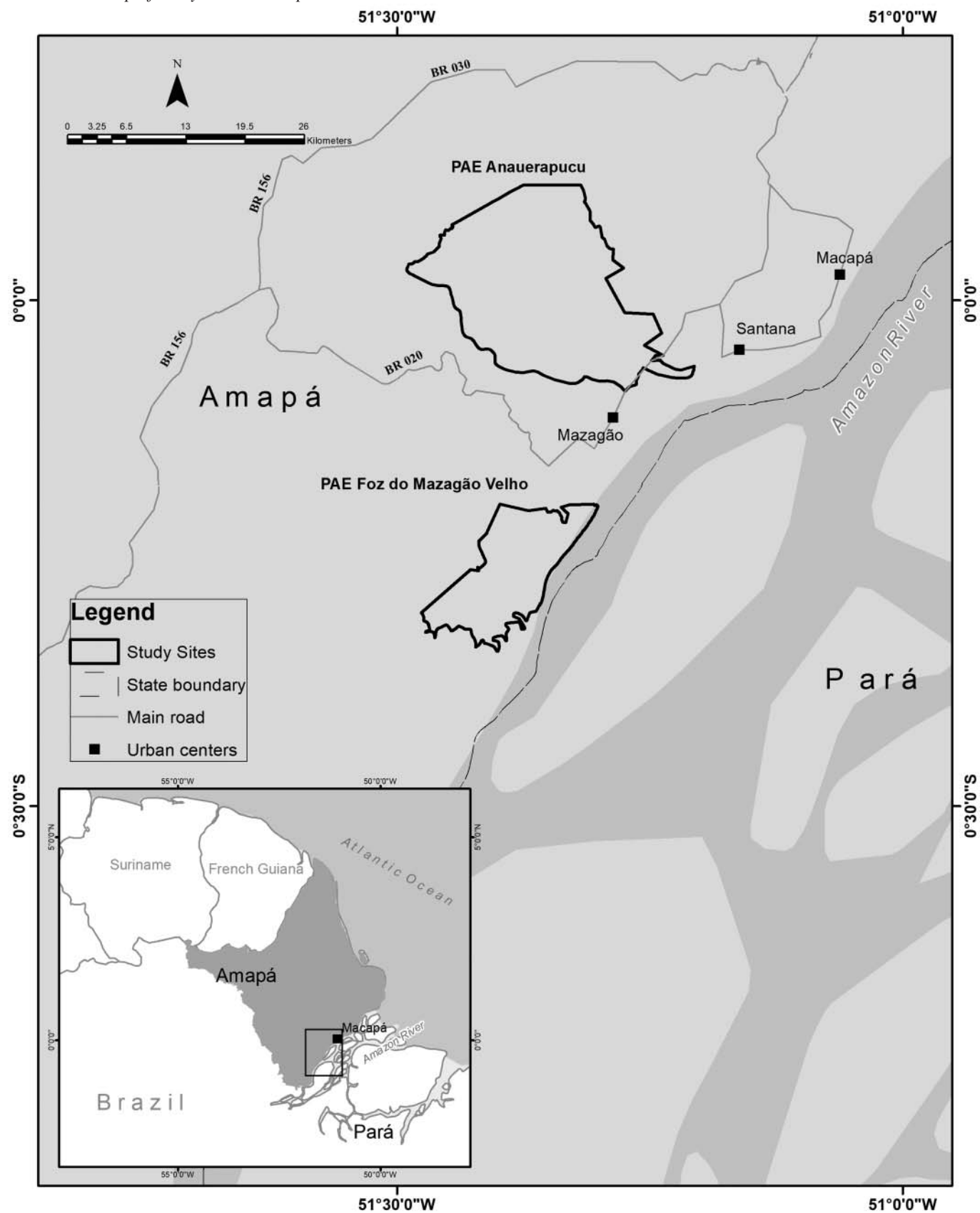
In 2014, semi-structured interviews were conducted with 27 purposefully selected producer households involved in family forestry – including producers and millers – in the two settlements. Selected households in the villages were identified using a two-stage cluster sampling method. First, hamlets within each PAE were identified by key informants as sites where families produced timber. Second, in the selected hamlets lists of families actively working with timber at the time as producers, loggers, or millers were generated with the assistance of community leaders. The lists were used to randomly select 16 households in Foz and 11 in Anauerapucu (Table 1). The sample size was limited by the time available at each site.

Household interviews elicited information on livelihoods, property rights, production strategies, forest management practices, and knowledge of forest regulations. Mill owners were asked about production trends and details of supply chain dynamics. For both types of informants, the goal was to assess their understanding of regulations related to timber activity in the study region and how their views influenced their use of forest resources. At the end of the interview, informants were asked if they had heard about Decree 3325 and their opinion of it. If they had not heard of the decree, it was explained, and their opinion was again solicited.

Other stakeholders involved in the value chain were also consulted (Table 2). Interviews were conducted with 16 owners and employees of lumber retailers (*estâncias*) in the Amapá ports of Santana (2) and Macapá (14) who bought and sold sawn wood from local mills. The aim here was to learn about their role in the supply chain for timber originating in the study region and more broadly the characteristics of the regional timber market.

Finally, ten representatives from government agencies involved in the forest policy reform in Amapá were interviewed to understand the goals and objectives of the policy reform, including the technical justifications for the changes. The agencies included two Amapá State agencies, the State Forestry Institute (IEF) and the Institute of Land and Environment (IMAP), created in the 2000s to help implement forest policy. Representatives from regional offices of federal agencies were interviewed, including from the National Institute for Colonization and Agrarian Reform (INCRA) and the national agency responsible for riparian areas the Secretariat for Union Patrimony (SPU). A researcher from the Brazilian Agricultural Research Corporation (EMBRAPA) was a key

FIGURE 1 Map of study sites in Amapá



Basemap Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
 Smallholders Data Source: https://certificacao.incra.gov.br/csv_shp/export_shp.py
 Road data: Open Street Map (OSM)

TABLE 1 *Population and sample size of selected communities in the target settlements, Amapá (2014)*

	Foz do Mazagão Velho PAE				Anauerapucu PAE	
	Mutuacá	Espinhel	Foz do Mazagão	Igarapé Grande	Vila Anauerapucu	Vila Nova
Resident families	34	15	57	49	250	38
Families working in the forestry sector	17	14	20	25	19	*
Families interviewed	3	2	4	7	9	2

* This information was not available during fieldwork

TABLE 2 *Local stakeholders and State agency representatives interviewed during three research stages*

Acronym	Name	Jurisdiction	Number of interviews		
			2014	2017	2020/21
Local stakeholders					
Foz PAE	Foz do Mazagao Velho PAE	Local	16	24*	2
Anauerapucu PAE	Anauerapucu PAE	Local	11	-	-
	Lumber retailers	Local	16	8	
State agencies					
IEF	State Forestry Institute	State	5	3	2**
IMAP	Amapá Institute of Land and Environment	State	2	1	1***
EMBRAPA	Brazilian Agricultural Research Corporation	National	1		
INCRA	National Institute for Colonization and Agrarian Reform	National	1	1	
SPU	Secretariat of Union Patrimony	National	2		

* 16 original + 8 new

** In 2019 IEF was dissolved, its responsibilities related to the forest sector policies were transferred to the State Secretariat for the Environment (SEMA) and the ones related to forest technical assistance to the Institute of Rural Development of Amapá (RURAP)

*** In 2019 IMAP was dissolved, its responsibilities related to the forest sector licensing were transferred to the State Secretariat for the Environment (SEMA) and the ones related to land regularization to the Land Institute of Amapá (Amapá Terras)

informant, given their knowledge of forest ecology and management in Amapá's floodplains and their direct involvement in the State forest policy reform, including the development of Decree 3325.

In September 2017, a second round of interviews was conducted in Foz with families that had participated in a community forestry training program intended to pilot the reform mechanisms. Anauerapucu was not revisited because it had not been included in the training program. Also, during this second field visit, follow-up interviews were conducted with lumber retailers, and additional interviews were conducted with the same representatives from IEF, IMAP, and INCRA. Results and analysis from the 2014 fieldwork were discussed with all interviewees.

In the third phase of the research, in September and October 2020 (when authors were outside the State), and again in early 2021, we contacted by telephone two key informants from the former IEF agency (which was dissolved in 2019 and the staff distributed among SEMA, the Environmental Secretariat and RURAP, the Institute of Rural Development of Amapá), one from IMAP (dissolved in 2019 and the staff distributed among SEMA and Amapá Terras, the Land Institute of Amapá) and two previously interviewed families from Foz to track changes in forest policy in the State.

RESULTS

In this section we first describe smallholder timber production systems in the study area and some components of the supply chains. We then provide an analysis of federal forest policy and regulations relevant to these smallholder systems. We present the State forest policy reform process in Amapá, finally reporting on the perceived impacts of Decree 3325 for family forestry and milling.

Small-scale forestry on the estuary

The reported land use and livelihoods of sampled households were similar between the two PAEs. Participating families reported an average landholding of 42 ha in Foz and 33 ha in Anauerapucu, with a range from <1 ha to 130 ha. All possessed formal documents recognized at the federal level legitimizing their land possession. Notably, 23 out of 27 smallholders retained mature forest area on their plots, covering an average 87 percent of the property in Foz and 66 percent in Anauerapucu. They maintained highly diversified but small-scale production areas within their plots but reported increased emphasis on açaí and much less on annual crops or timber compared to past decades. Only nine families cultivated

annual crops, and seven of those were in Anauerapucu, where a government program guaranteed purchase of family farm products. With the exception of only two families from Foz, all maintained açai stands (*açaízais*) on their landholdings, originating either in mature forests, where farmers had removed large canopy trees to encourage açai growth, or in agricultural fallows, where they managed natural regrowth to optimize for açai.

Community leaders reported that 11 family sawmills were operating in Foz in 2014, of which seven were included in our sample. These small sawmills operated on the millers' property. One of the mills included a furniture workshop. The other 19 households (eleven from Foz and eight from Anauerapucu) either engaged in logging and/or sold standing trees. Five families in Foz sold trees in 2014 versus two in Anauerapucu.

While in the past families would fell their own trees and transport logs to the mill, in 2014 the millers provided this service, selecting only high value trees. Informants reported that timber harvested in the previous 12 months was mainly for domestic use, for example for repairs or new construction. Motives for selling timber included the need for cash for unplanned expenses, supplemental income when açai was out of season, or the need to clear trees to establish new *açaízais* or manage existing stands. In general, farmers strategically selected trees for harvest to open canopy gaps that would promote açai regeneration or growth. They reported that they saved only trees that would serve for future timber harvest.

The mill owners processed timber from their own property, and all but one supplemented that with supply from neighbours. Millers reported that their output in the past decade had been primarily for the local market, to neighbours and lumber yards in Santana and Macapá. During the 2014 interviews, none were aware of formal transactions with government agencies or registration at any point in their engagement with the supply chain.

They reported several challenges to the harvest, transport, processing, and sale of the trees and lumber originating from the smallholder forestry system in the region. First, logging and milling were highly dependent on manual labour, which was scarce since many people preferred work with açai. Also, logging was perceived as hard and dangerous work, and the operations lacked safety equipment or procedures. Second, millers reported a reduction in local timber stocks, which resulted in greater travel distances to find timber and increased transport costs. Finally, they reported that the informal structure of the value chain weakened their market leverage and resulted in low prices for their products and high risk of fines and wood confiscation. In addition, mill owners reported that the informality threatened their dignity, recounting how the environmental police not only fined them for unauthorized transport of timber but also demanded bribes and verbally humiliated them. They reported that they could not afford to comply with formal regulations but also lacked the technical capacity to do so. Thus, the sawmill owners preferred to sell the lumber in the community, where transportation costs were low, and they did not risk encounters from the environmental police.

To overcome these challenges and improve timber production, mill owners recommended “*appropriate forest regulation and monitoring*.” For them, the licensing procedures must be feasible for the forest owner to comply with management and harvest regulations, which would allow all actors downstream on the supply chain to work without fear of sanction. This statement by a small sawmill owner captures a widespread sentiment among both producers and loggers.

“They [government officials] should create [regulations] that are aligned with the small sawmill’s reality, because they aren’t. I don’t chop down a tree because I like to; I do it because I need to and my heart hurts when I do it, with the number of birds that live in the tree. I need to survive; that is why I log. The problem is that the environmental [guards] arrive and fine us, and they don’t want to understand our reality. If the timber was legal, I could transport it over land, but because it is illegal, we have to transport by river, which is much more expensive.”

Millers also emphasized the importance of technical assistance, capacity building and access to credit to invest in production improvements, as reflected by the following statements:

“We should have access to technology and to equipment for furniture making. The government should give us support for that. My dream is to be able to use all the timber; currently, we use only 50% to make boards and the rest is wasted [as sawdust and scrap].”

“The government should provide credit and technical support for us to do timber management. Most of the properties no longer have timber, so we need to grow it; here the timber develops very fast. We just need some support.”

Finally, millers indicated that formalization should also lead to higher prices along the supply chain, which could provide incentive to plant more trees and manage for timber again on these landholdings.

Federal norms for timber management in floodplain settlements

Forestry legislation in Brazil is extensive, complex and distributed among legal instruments produced by different agencies, some of which are complementary, others conflicting (Carvaleiro *et al.* 2008). Regardless of the type and scale of forest operation, formal authorization for commercial forest management in Brazil has always been required with some previous attempts to streamline the process for community operations (Waldhoff and Vidal 2015, Azevedo-Ramos and Pacheco 2017, Costa *et al.* 2018). Historically, regulatory processes were highly centralized and bureaucratic. However, following a global decentralization trend in forest administration, which had started in the 1980s (Agrawal and Ribot 1999), Brazil began decentralizing its forest sector in 2006 with the Law on Management of Public Forests (Law

n° 11.284) (see also Rocha *et al.* 2020). This law distributed responsibilities for forests among national, State, and municipal government agencies. States gained authority over the management of forest on public lands, State conservation units, rural properties, and rural settlement projects within their jurisdiction.

Even though this decentralization process meant States could create their own regulations, as we explain below, the agencies responsible for forest licensing in Amapá were using federal norms to orient their activities until 2013.

Interviews with key informants from governmental agencies in Amapá coupled with our own reading of the forest policy revealed four key federal norms relevant to forest management on the estuarine floodplain: two institutional norms from the Ministry of Environment (IN-04, IN-05), one from the National Institute of Colonization and Agrarian Reform

(INCRA, IN-65), which applies to lands located in settlements projects managed by INCRA, and one resolution from the National Council of Environment (CONAMA Resolution 406) (Table 3).

IN-04 defines the process for landowners to demonstrate legitimate property claims to initiate forest management planning. Among required steps, applicants must receive authorization, referred to as APAT (*Autorização Prévia a Análise Técnica*, Authorization for Technical Analysis), which is based on a preliminary technical evaluation of the legitimacy of their property rights. The APAT is administered by the competent State environmental agency. This legal analysis requires the applicant to provide valid personal identification, a map of the forest area proposed for management, and most importantly, the land title or similar documents from the State office of INCRA.

TABLE 3 *National-level Normative Instructions (IN) and resolution related to community forestry in PAE settlements*

Norm (Year)	Institution	Purpose	Requirements and/or description of procedures
IN-04 (2005)	Ministry of Environment	Describes the process to obtain a preliminary license for technical analysis (APAT)	Applicant's valid identification, map of the forest area proposed for management, and land title or other proof of possession.
IN-05 (2005)	Ministry of Environment	Describes technical procedures for the elaboration, execution and evaluation of sustainable forest management plans (SFMP) for low and high intensity operations	1-SFMP: information on the landholding and forest to be managed including silvicultural system adopted; list of species to be protected; list of species to be harvested; logging cycle; intensity of logging; size of production units and planned annual production; a 100% inventory of commercial species and logging methods; volume estimate; maps of the landholding with microzoning. 2-Annual operation plan: list of planned activities for the production unit during the year. 3-Report of general activities: information about the sustainable management area, description of activities completed, and the volume harvested in the previous 12 months.
CONAMA Resolution 406 (2009)	National Council of the Environment	Establishes technical parameters for the elaboration, presentation, technical evaluation and execution of SFMP	Procedures for calculating harvest intensity; determination of the default minimum harvest diameter of 50 cm for all species; description of procedures to calculate specific minimum harvest diameters; procedures to use timber residues after logging (e.g., branches, roots).
IN-65 (2010)	National Institute of Agrarian Reform-INCRA	Establishes criteria and procedures for sustainable forest management activities in PAE, mainly (a) to ensure that the settler or the collective group that represents the settler is the holder of the SFMP; and (b) to establish that forest management activities inside land reform settlements cannot be carried out by third parties. It also presents procedures for the approval of the APAT prior to submission to the competent environmental agency and requirements for documenting agreement to elaborate a SFMP.	1-Documents required for APAT in a PAE: * Association's Bylaws, updated and notarized; * Associations National Register of Legal Entities (CNPJ); * Concession of use rights contracts (CCDRU); * Identification documents of all settlers involved; * Association's minutes approving forest management; * Signature of all involved. 2-Requirements to develop SFMP: * Provisional or definitive land title of forest managers; * Environmental license for settlement; * Qualified technical assistance for forestry activities; * Topographic map for the settlement.

Table 3 is intended to illustrate key aspects of regulations and is not an exhaustive list.

IN-05 defines the requirements for preparing sustainable forest management plans, presenting differentiated regulations based on the scale and intensity of proposed forest extraction (high versus low). The non-mechanized operations by smallholders and communities generally fall under low-intensity forest management. The steps and required information for the licensing procedure for both management categories are similar, requiring all landowners to prepare a sustainable forest management plan (SFMP), an annual operational plan (POA, acronym for *Plano de Operação Anual*), and an annual harvest activity report. The two main differences between high- and low-intensity systems are that the maximum allowable annual harvest in low-intensity systems is $10\text{m}^3\text{ha}^{-1}$, compared to $30\text{m}^3\text{ha}^{-1}$ for high-intensity mechanized operations. The plans and reports for low-intensity operations systems are less detailed. Importantly, for both categories of forest management, the plans and reports have to be supervised and signed by a licensed forester.

The CONAMA Resolution 406 complements IN-05 by defining technical parameters to be adopted in all phases of the SFMP, from elaboration to execution.

The fourth relevant federal norm IN-65 dictates a critical step linking forest rights to land tenure, requiring INCRA to verify that the applicant complies with regulations related to land ownership and forest management. Two key aspects of the norm are especially relevant to estuarine smallholders at the center of this study. First, the norm defines procedures to verify whether the proponents of the plan are settlers that have a definitive or provisional title required for emitting the APAT. This ensures that the settlers will be the beneficiaries of the forest activity and is a response to repeated historical irregularities observed in contracts between logging companies and settlers in land reform settlements in the Amazon (Costa *et al.* 2018). Second, it establishes criteria to verify if proposed management activities have been supervised by a licensed forester and, if located in a settlement project, whether the settlement has an environmental plan and a topographic study. If both criteria are met, INCRA authorizes the SFMP. This norm also States that the only type of forest management that can be licensed in settlement projects with communal property rights is community management proposed by an association or cooperative.

The IN-65 is especially salient for small-scale forestry on the estuarine floodplain since demonstrating property rights there is not straightforward. Historically, Brazilian legislation treated all land affected by tidal or seasonal flooding as national patrimony that could not be titled to individuals or communities. Such lands were managed by the Secretariat for National Patrimony (SPU). However, this issue shifted in the early 1980's when the government introduced a new land reform modality called a PAE¹. This new modality allowed INCRA to define and title communal polygons and grant usufruct rights (but not individual titles) to resident families so they could maintain traditional livelihoods based on sustainable extractive activities within customary holdings (Benatti 2016).

Historically, the lack of property rights for floodplain residents resulted in their exclusion from the formal timber sector. The creation of the PAE helped but was still insufficient. In 2005, in response to pressure from social movements, a joint initiative between INCRA and SPU attempted to further clarify land tenure regularization in floodplains (Valadares 2013). The result was the TAUS (*Termo de Autorização de Uso Sustentável*, Terms for Authorization of Sustainable Use), a document that recognizes the floodplain lands occupied by families and authorizes their sustainable use, among other benefits (Valadares 2013).

In subsequent years, new laws (11.481/2007 and 11.952/2009) defined an additional mechanism, the CCDRU (*Contrato de Concessão de Direito Real de Uso*, or Contract of Concession of Use Rights), which established a stronger legal bond between recipient families and their land and allowed use rights to be inherited (Chiavari *et al.* 2016, Valadares 2013). In a two-stage process, the SPU grants the CCDRU to INCRA, and INCRA, in turn, allocates the CCDRU either to individual families or to community associations in the PAE. Neither the TAUS nor the CCDRU is equivalent to a land title, nor do they provide property boundaries. While the CCDRU granted to households defines the proportional share of the territory each family is hypothetically entitled to, it is not based on the area they actually manage, nor is it demarcated. When the CCDRU is granted to an association it refers to the entire territorial area of the PAE.

Thus, to receive legal authorization for forest production, floodplain communities must first demonstrate property rights under IN-65 and then go through a bureaucratic process governed by IN-04, IN-05 and CONAMA Resolution 406, which had been originally designed to regulate high-intensity forestry operations of commercial timber enterprises (Carvalho *et al.* 2008, Azevedo-Ramos and Pacheco 2017).

By 2012 it was clear that small-scale forestry operations in the estuarine floodplains were not well-served by these federal norms for the authorization to harvest timber. Thus, in 2012, the new Forest Code (Law no. 12651) introduced progressive changes that mandated a simplified process for the approval of community forestry but left the responsibility for defining and implementing the norms to the States. This mandate for a simplified process sparked the forest policy reform in Amapá.

State forest policy reform in Amapá

In response to the 2006 decentralization in the forest sector, the Amapá State government created two new agencies: the State Forestry Institute (IEF), to strengthen the forestry sector and provide technical assistance to rural communities, and the Institute of Land and Environment (IMAP), to oversee land tenure regularization and environmental licensing. IEF was charged with responding to the 2012 federal mandate for States to develop the implementing norms for community forestry regulation. IEF initiated a participatory process to develop the Amapá State Forest Policy and norms to better

¹ The first PAE, São Luís do Remanso, was created in 1987 in the State of Acre (Hall, A.L., 1997).

address the needs of small-scale forestry operations, specifically those of communities and families.

To carry out the proposal of the reform IEF hired policy experts from the Rural Federal University of Rio de Janeiro. The university team began with an evaluation of the forestry sector and forest governance in the State through 17 consultative meetings with relevant government agencies, private institutions, and civil society. Based on that review, the policy reform team led by IEF identified key barriers and bottlenecks to legalizing small-scale forestry operations. The reformers drafted a bundle of five regulatory instruments² for executive or legislative adoption. They also attempted to streamline procedures and align legal instruments overseen by different government sectors and agencies. The State then set out to address two overarching bottlenecks identified in the review, namely, onerous regulatory procedures for forest management plans and limited possibilities for documenting forest property rights.

The most relevant policy change for small-scale forestry in the estuary was the Forest Management Decree, known as Decree 3325, which set out to simplify the onerous federal forest management regulations. Four key components of this decree are relevant to our study.

First, while the federal norm IN-05 differentiated licensing requirements for high- and low-intensity forest management, the Amapá State Decree 3325 further differentiated these categories to enterprise (high-intensity) and small-scale (low-intensity), the latter of which can be proposed individually or by the community through an association or cooperative. In addition, for small-scale operations, the decree differentiated

allowable harvest volumes of 5 m³ ha⁻¹ for upland forests (*terra firme*) and 10 m³ ha⁻¹ for floodplain forests (*várzea*)³, to account for higher primary productivity on the floodplain (Ayres 1995).

Second, under the federal regulation IN-04, a definitive land title or usufruct concession document was a prerequisite for approval of a forest management plan. However, gaining usufruct concession documents involved lengthy judicial analysis for approval. Decree 3325 attempted to facilitate legal access to the forest by defining 16 alternative land documents to prove de facto rights. For smallholders in the floodplains specifically, the decree recognizes the TAUS and the CCDRU.

Third, it was clear from the forestry sector evaluation that requirements for presenting the sustainable forest management plan defined by IN-05 included insurmountable barriers for smallholders. Decree 3325 introduced a simplified procedure for small-scale operations (Table 4), eliminating the forest inventory and land maps. For individual smallholders, it dropped the requirement for a licensed forester to supervise and sign SFMPs, however plans submitted by community associations or cooperatives, for example organizations representing PAE residents, still needed a forester to supervise and sign off on the plan. Although the three steps defined in the federal norm for the licensing procedure were not changed, the requirements for small-scale (low-intensity) SFMPs and POAs were simplified for individual landowners and for communities. The Amapá policy reform also proposed cutting bureaucracy by creating a special office in IMAP to process paperwork from small-scale producers.

TABLE 4 Decree 3325 requirements for presenting Sustainable Forest Management Plan for individual and community applications

Procedural requirements	Additional requirements or exemptions according to applicant category
1-Sustainable Forest Management Plan (SFMP): simplified SFMP providing information about the property area and land use; definition of area to be managed; identification documents of the landowner. 2-Annual Operation Plan: estimated volume of timber to be harvested and average volume per ha; equipment to be used; number of people working in the operation; methods for processing and selling harvested timber; geographic coordinates of the management area; and for each tree to be harvested, a list with species, circumference, height and volume (not a full forest inventory). 3-Harvest report: list of trees harvested, including species, circumference, height and volume. 4-Sketch Map (croquis) of the landholding area and area under management. 5-Signed terms of responsibility for forest management.	Individual applications - Can be exempt from technical assistance requirement (Art.98, 4°). Community applications (associations or cooperatives) - Proof of technical assistance by Forest engineer. - General information about the association/cooperative (name, address, membership names and identification number etc). - Notarized proof of association/ cooperative's legal status. - Terms of Responsibility for forest management signed by all members.

² These were the Law of the State Forest Policy (pending); Law of Management of Public Forests (pending), Decree No. 5762 on Forest Concessions, Decree No. 3325 on Forest Management, and the State Forest Program (Decree No. 3528). In 2017, the first two were still being negotiated within the State government, and ultimately were never approved by the State legislature (M. Marinho personal communication, June 28th, 2021).

³ The CONAMA Resolution 406 cites research on of average tree volume, harvest intensity greater than 10m³ ha⁻¹ could be authorized but would be limited to three trees per ha for harvest without machinery.

Fourth, to adapt regulations to the fallow forestry silvicultural systems typically used by smallholder farmers on the floodplain, Decree 3325 changed the rules for harvesting two fast-growing species common in fallows on the estuary based on scientific studies of their growth rates, *pracuúba* (*Mora paraenses* [Ducke]Ducke) and *pau mulato* (*Calycophyllum spruceanum* (Benth.) K. Schum.) (Castilho 2013, Guedes et al. 2012). It differentiated the minimum diameter of 50 cm for harvest in low-density stands and of 70 cm in high-density stands for *pracuúba*. The decree also allowed for thinning of small-diameter trees (10 to 30 cm) in dense stands of *pracuúba* and *pau mulato*.

These four aspects of the Decree 3325 – differentiating harvest volumes according to forest type, broadening the documentation to prove land rights, simplifying the procedure for obtaining a license to carry out forest management operations, and loosening minimum diameter for harvest and thinning operations for certain species – were designed to facilitate the legal entry of small-scale actors into the timber sector. In the next section we present the perceptions of actors with a stake in this reform, government agents, small-scale timber producers, and downstream supply chain actors.

Perceived impacts of Decree 3325

Timber producers

During initial interviews with participating farmers in 2014, before discussing the Decree 3325, we asked if they knew the procedures to formalize production. None knew the full set of requirements, and most reported that they did not understand how to regularize their production. Families that had tried to obtain licenses said they had never succeeded and that government agencies had not provided the necessary information to legalize their activity, as stated by this producer:

“To do legal forest management we need a license, but it is very hard to obtain this license and no one gives us correct information about it. To get the license for my chainsaw I went three times to Macapá, and I didn’t get it. It is a lot of time and money that we spend to go to town.”

In 2014, among the informants in Foz and Anauerapucu, only the president of the association of Foz knew about Decree 3325. When the salient points of the decree were described, respondents did have opinions. Regarding the revised thinning allowance, in general, farmers recognized the importance of thinning trees in areas of forest regeneration, but opinions were mixed about the relevance of the rule, some doubting that there was much of a market for small-diameter logs. The majority (70 percent) opined that it was not worthwhile to mill 30-cm diameter logs because it would produce few boards, and, since the wood was not mature, the boards would warp. They suggested that trees should have diameters of at least 50 cm to provide sufficient return for the labour invested. One informant expressed concern:

“Without appropriate monitoring, it would be impossible to know if logging is being done in regeneration areas with

high densities of pau mulato and pracuúba or in mature forest areas. If [the government] allowed the removal of these small trees, they will be finished.”

Also, some respondents explained that these high-density stands of *pau mulato* only occur in areas left to fallow after they had cultivated crops. However, fewer families were growing crops due to a preference for açai, and, as a result, there are few new fallow areas where thinning operations might promote the growth of *pau mulato*. Some smallholders associated the decline of *pau mulato* with the reduction of annual crops production, as one stated:

“People removed too much pau mulato and did not plant. If people planted crops and let it fallow, the timber would come back. Pau mulato likes the fallow, the fire helps it germinate. After you harvest your corn, you will see that the area is full of pau mulato.”

As a second concern, informants had mixed views on the timber volume allowed for harvest ($10 \text{ m}^3 \text{ ha}^{-1}$ on the estuary). Many informants (44 percent) felt this volume was too low for families that depended on logging for their livelihood or even to clear new areas for the intensive management of açai. Others (33 percent) thought the volume was reasonable because it would allow them to produce timber and conserve the forest at the same time. As one informant stated: *“I think it’s reasonable, because if [the forest] finishes one day, it will fail for us. We have to take care of it.”*

In 2014, after our first field visit, State planners set out to test the new norms and mechanisms once the new policy was in place. The State engaged an NGO to carry out reform-related capacity building in five rural settlements, including Foz, providing training on how to develop SFMPs, supposedly in accordance with Decree 3325. As part of the project, the NGO published a manual to explain the new guidelines to small-scale producers so they could license their timber (Farias et al. 2016).

During our second field visit to Foz in 2017, only five of 16 families we interviewed knew about the salient changes introduced by the Decree 3325. These five were among the 13 that had participated in the 2014 capacity building project related to the implementation of Decree 3325. Participants stated that before the training they had not known about the regulatory procedures to legalize their forest production. All these families said that after completing the training course they would be able to gather the necessary information for the application requirements, however they would need the technician to process the data and generate the required maps with the localization of the trees. All families evaluated the pilot project as positive overall but were disappointed that their forest management plans developed under the project to date had not been approved.

Timber processors and sellers

In 2014, none of the 16 timber sellers in Macapá and Santana had any knowledge of Decree 3325; even in 2017 the eight urban lumber sellers re-interviewed were still unaware of the

decree. Millers did, however, note two changes in the sector since 2014. First, they stated that the supply of *pau mulato* had declined. Second, due to the economic recession, lumber yards were unable to pay up-front for the lumber delivered. They would only be able to accept and pay for lumber on consignment.

Representatives from the family sawmills reported in 2017 that they had either reduced their operations or had shut down altogether. Informants reported that of the 11 family mills operating in Foz in 2014, two had closed and one had been sold. The families that decided to close their mills reported that the environmental authorities had recommended it. In the other case, the mill was sold because it was no longer financially viable once urban lumber yards could no longer pay for the wood in advance. All the mill owners reported dedicating more time to managing açai.

Government agents

In 2014, the 11 government policy makers and technicians interviewed presented a mix of low awareness and apathy towards the forest policy reform in Amapá. Two government informants were not familiar with the policy changes underway, while two others reported their familiarity but continued to use federal norms and protocols. For example, one from IMAP continued to use the federal norms believing that the initial evaluative analysis conducted by IEF was inadequate. They felt that the consultation meetings with government agencies during design of the reform were only informative, and that participants' views were not reflected in the final decree text.

This informant further suggested that the decree was not aligned with the reality of floodplain communities, citing the reform's failure to include measures that promoted ecosystem conservation specific to the floodplain forest, such as rules to stabilize riparian areas in communities or rules that considered the effect of tides on timber management. They also thought that the harvest volume in the small-scale category was too low given the high regeneration capacity of the floodplain forest. Finally, the informants pointed out that the procedures for licensing smallholder production presented by the Decree 3325 were still overly complex. They concluded: *"It is necessary to create a norm that offers solutions for the particularities of each context. In synthesis, the decree changed nothing. They spent public money to elaborate a law that doesn't change anything."* In their view, the rules dictated in the decree did not differ much from the federal norms they used (IN-04 and IN-05).

In 2017, informants from the two agencies primarily responsible for administering the timber licensing procedures were aware of Decree 3325 but said that they were not implementing it. In the opinion of one informant from INCRA who was not following the new procedure defined in the decree, the approach taken by IEF to make the procedures less bureaucratic was not appropriate. The informant believed that the reformed procedures should agree with the legislation used by other agencies:

"In INCRA we use norm IN-65 that requires that SFMPs have technical supervision, but the decree [3325] exempted this responsibility. But, how is a small producer going to be able to develop a management plan? The requirements should be simplified, but [the changes should] not eliminate the role of the forest engineer. Instead, IEF should invest in technical assistance and provide this service to smallholders."

An informant from IMAP suggested that Decree 3325 did not facilitate the licensing process and had no impact on floodplain communities. However, they mentioned that the judicial department of IMAP had accepted the use of TAUS and CCDRU as proof of land possession on floodplain areas and that they had emitted APAT for the community forest plan in Foz.

One informant from IEF who was actively involved with developing Decree 3325 in 2013 suggested that the biggest challenge to its implementation was IMAP's resistance to adopting it. They further complained that even though all IMAP technicians were invited to participate in the meetings to design the decree, the majority chose not to. Because many IMAP technicians were still not aware of the decree, this person suggested, they erroneously continued requiring a full forest inventory according to IN-05 a requirement that no longer applied in Amapá. In addition, they pointed out that IMAP lacked sufficient technical staff to process and analyse applications from small-scale producers, even though the decree prioritized this.

Implementing NGO

Crucially, even the NGO charged with testing the implementation of the reform mechanisms with smallholder producers opted to ignore some procedures set out in Decree 3325. A forester from that NGO explained their reasoning. Acknowledging the conflict between State (Decree 3325) and federal regulations (specifically IN-05, IN-65), and recognizing that federal agencies still controlled key steps in the approval process, the NGO operatives elected to lead landholders along a path that would most likely ensure approval of SFMPs. They decided that since the State forest agency IMAP and the national agency INCRA were still operating under old protocols and would only authorize plans that complied with IN-05 and IN-65, the project would privilege the federal rules. The practical guide they developed to explain the administrative process for forest operations in the State, therefore, maintained the requirement that forest engineers submit management plans on behalf of individual small-scale operators and supervise the forest inventory, even though both requirements were supposed to be eliminated by Decree 3325 for those actors.

In summary, the NGO staff felt that Decree 3325 was not feasible in practice because of disagreements between technicians at two State agencies, IEF and IMAP, and that this conflict stifled efforts to implement the reform. Another barrier to developing a feasible pathway for community forestry, according to the NGO staff, was inertia by INCRA in resolving obstacles inherent in its own norm. This informant

recounted a case that illustrates the crux of the problem. Through the project run by the NGO, 13 families in Foz requested authorization through the community association of Foz do Mazagão to harvest timber by first applying to INCRA to emit the APAT required to start the licensing process. INCRA's response took eight months to arrive. Once the APAT was emitted by INCRA, forest technicians obtained the APAT from IMAP. After that they prepared the community management plan according to IN-05 and IN-65, but, ultimately, INCRA did not authorize the plan. The reason given was that the Foz PAE needed a topographic study, as stipulated in IN-65. Ironically, the topographic study was the responsibility of INCRA. As of July 2021, approval of the community management plan was still pending. In fact, not a single community forest management plan had been approved in the State of Amapá by this date.

Finally, the NGO technician considered the lack of technical assistance to be another key challenge for community forestry in Amapá. The technician argued that the State needs more staff and more training to effectively support community forestry.

DISCUSSION

The results of this study illustrate a State-level attempt to reform forest policy in Brazil to better respond to the needs of smallholder and community timber producers. Although well intentioned, the reform has all but failed, largely due to bureaucratic inertia and a mismatch between State and federal rules.

Amapá's Decree 3325 attempted to facilitate timber licensing for families and communities located on the estuarine floodplain in four ways: expanding the list of acceptable documentation for proving property rights, simplifying the procedure for obtaining a license to carry out forest management operations, loosening the minimum diameter for harvest and allowing for thinning operations for certain species, and differentiating allowable harvest volumes between floodplain and upland forests. These changes were a State response to challenges apparent in federal norms governing property rights and to rules defining forest management planning and operations that did not reflect the realities of forest management in estuarine communities in Amapá. We discuss each of these elements in relation to the federal norms and the constraints perceived by smallholder producers.

First, securing land tenure is an essential first step for acquiring timber rights and formalizing forestry operations (Cronkleton and Larson 2015). Historically, floodplain residents have been excluded from regional timber supply chains due to the lack of legal property rights to land and resources, limiting their income (Pinedo-Vasquez *et al.* 2001). Joint efforts at the national level by INCRA and SPU have allowed floodplain residents to demonstrate use rights by emitting two types of documents, the TAUS and CCDRU. The Decree 3325 recognized these important advances in land tenure regularization and allowed both documents to be used as proof of

de facto rights on the floodplains in Amapá, which could allow smallholders residing there to formalize their timber operations. Although initially IMAP was reluctant to accept these documents as proof of land possession, their judicial sector eventually did. As a result, the Foz do Mazagão association received the APAT for their management plan, which set a precedent for other associations in the floodplain.

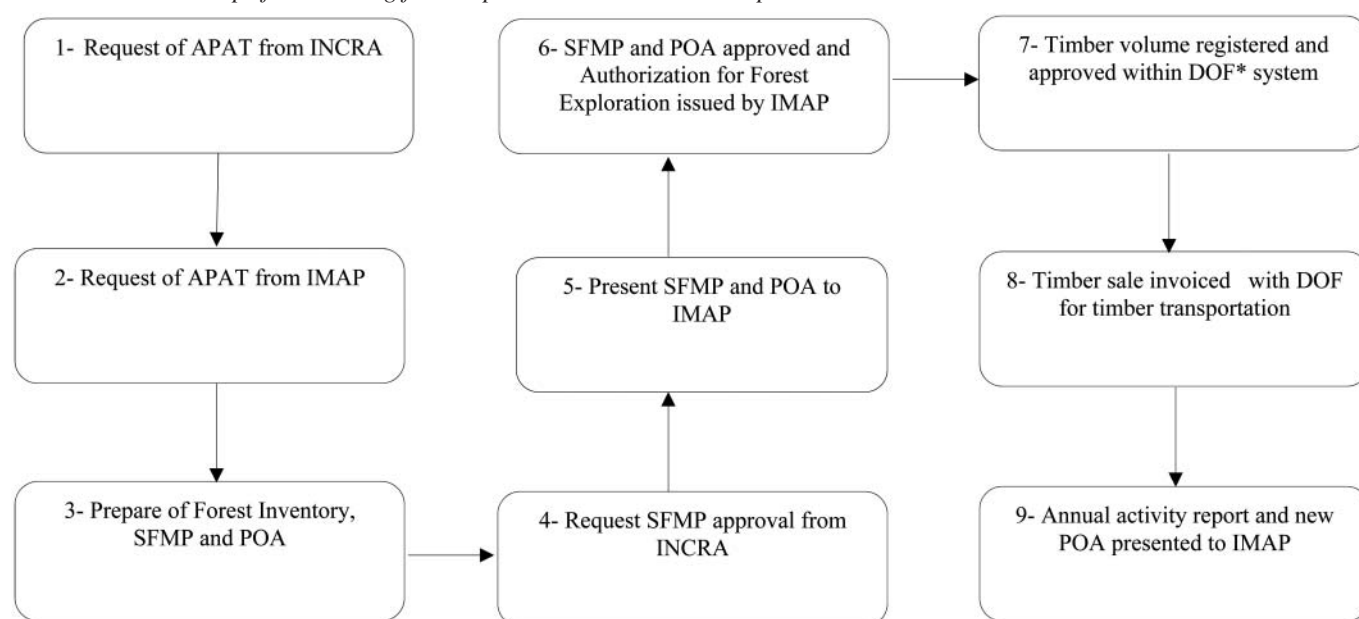
Second, the decree tried to make the licensing requirements easier for smallholders by simplifying the presentation of SFMPs and operational plans and exempting individual smallholders from technical supervision by foresters. This latter exemption could be an important step in making smallholders less dependent on external support for completing the licensing procedure (Fortini and Carter 2014). Initially, the lack of technical capacity among smallholders to write their own plans could be a constraint, but families can easily learn the new procedures for estimating volume and mapping the land. However, we did not observe smallholders attempting to take these steps on their own. Importantly, certain exemptions were not extended to community organizations requesting authorization, including those from PAEs. Thus, community SFMPs still had to be supervised by a forestry technician.

Although the requirements were simplified by the decree, the pathway for approval was not, since authorizations from multiple agencies were still required (Figure 2). Furthermore, the State agency IMAP was still requiring a complete inventory and maps of the area, requirements that were dropped by the decree. Given the fact that smallholders inside PAEs can only apply for a community SFMP, they still rely on foresters. However, with exception of the 2014 NGO project to pilot Decree 3325, smallholders in the Amapá floodplain have had no access to technical assistance or credit lines to support timber management. As a result, most smallholders in our sample were unaware of the Decree 3325.

The most critical barrier, however, were the federal licensing agencies' enforcement of the federal norms IN-04, IN-05, and IN-65 that served as key steps in the administrative process, and the State agencies' unwillingness to pursue alignment with the State decree. The federal agencies had little incentive to respect State guidelines. In fact, it was not surprising that they were unwilling to abandon standard federal procedures to adopt others to reflect each States' regulations, since this would only complicate their processes.

Third, Decree 3325 included specific changes concerning the management of two of the most utilized species in the floodplain, *pracaúba* and *pau mulato*. Smallholders recognized the importance of thinning trees in areas of forest regeneration but reported that they have very few areas of new fallow, where these operations would be carried out. Thus, while the new rule is welcome, it does not address current forest management practices in the region, as the majority of smallholders were not opening new agricultural areas, where these species regenerate in high density (de Queiroz and do Amaral Machado 2007). Farmers who were managing fallows were converting them into *acaizais* rather than maintaining tree diversity for timber production (Freitas *et al.* 2021). This confirms previous research showing that floodplain farmers

FIGURE 2 Main steps for licensing forest operations in PAEs in Amapá



* Forest Origin Document (DOF, Portuguese acronym for *Documento de Origem Florestal*)

constantly shift their resource management practices in response to shifting ecosystem dynamics and market conditions (Pinedo-Vasquez *et al.* 2002, Pinedo-Vasquez *et al.* 2001, Vogt *et al.* 2015). Producers also questioned the utility of the option to harvest small-diameter trees, suggesting that the low volume and low quality of milling output would not justify the cost.

Finally, Decree 3325 differentiated allowable harvest volumes of 5 m³ ha⁻¹ for upland forests and 10 m³ ha⁻¹ for floodplain forests. Smallholders' opinions of this change were mixed, but the majority considered the volume to be very low, especially for millers who rely on timber for their livelihood. There is some room for adapting this norm to local conditions, since the implementing norm, the CONAMA Resolution (406), States that this volume could be raised based on specific studies from the region. Thus, further ecological studies from the Amapá estuary could help to adapt the rules to reflect the regional context.

Amapá's proposed State Forestry Law was designed to provide broad guidelines for improving bureaucratic efficiency and accessibility for all forestry actors by centralizing the licensing rules. The proposed law clearly stated that the government could create simplified mechanisms for the development, analysis and approval of management plans specifically for small-scale operations. The Decree 3325 and other instrument were approved, but as of October 2021, the law itself had not yet gone to the State Legislature for approval due to opposition from conflicting coalitions. Thus, the intended goal of the forest policy reform project was not fully achieved. In part this was due to the failure to date to pass the law. Also this was indicated by the fact that federal agencies still controlled key steps in the approval process and that both IMAP and the INCRA office in Amapá continued operating under federal protocols.

The State of Amapá is not alone in its failure to carry out forest sector reform in favour of smallholders and rural communities. Government agencies and civil society groups in neighbouring Pará have been discussing a proposed State Policy for Community and Family Forest Management since 2012, but it is yet to be approved (MPPA 2019). Attempts to do so in neighbouring countries have also come up short (Mejía *et al.* 2015, Sears *et al.* 2018).

While we applaud efforts to create opportunities to formalize small-scale timber production in Amapá, we recognize that simplifying norms and relaxing regulations for certain species and silvicultural systems is not usually sufficient to create change (Holding Anyonge and Roshetko 2003, Sears *et al.* 2018). Independently of whether foresters must sign plans or not, smallholders need to develop new capacity to understand the procedures to license timber production and to be able to deliver the technical information that is required. In fact, achieving equity and sustainability in the smallholder forestry sector requires advances in four key areas: policies, institutions, and governance; livelihoods and capacities; cultural and socio-economic aspects; and securing the natural resource base (de Jong *et al.* 2016). The situation in Amapá falls short in some of these areas, particularly in the State institutions' role in forest governance and in its capacity to provide technical assistance to allow compliance with formalization requirements.

In the absence of an accessible pathway for formalization of timber management, harvest and processing, all actors on the supply chain, and especially timber producers and millers, will continue to be vulnerable to sanction from law enforcement and will necessarily continue to work in the shadows. Inequities will continue, since transport costs are high and the selling price is low in the informal sector. The lack of formality also prevents actors from accessing credit to invest

in forest management operations or in appropriate machinery to reduce processing waste. In the end, while not the only factors, the low returns and high risk of sanction has likely reduced the production of timber from Amapá's floodplain communities compared to historical levels (Fortini and Carter 2014).

Given the importance of sustainable forest management for biodiversity conservation and confronting the climate crisis (Imai *et al.* 2009), and the prevalence of smallholder and community forestry in the Amazon (Pokorny *et al.* 2013), greater efforts should be made to support it. Formalization of community forestry coupled with technical assistance has the potential to support local livelihoods, address climate change, and strengthen the forestry sector. Studies indicate that sustainable timber production is still possible in the Amazon estuary (Fortini 2019).

While it has been shown that timber production is compatible with non-timber forest products (Guariguata *et al.* 2010), the dramatic shift over the past decades on the estuary toward commercial açai production is concerning. Açai-intensive systems that lead to mono-specific stands simplify the landscape, ultimately reducing resilience in the ecosystem and household economy (Weinstein and Moegenberg 2004, Freitas *et al.* 2021). Easing the pathway for smallholders residing on the floodplain to formalize timber production could provide some incentive to revert to the diverse forest management systems of the past.

CONCLUSIONS

On post-industrial logging frontiers in the Brazilian State of Amapá, smallholder families have developed adaptive farm-forestry systems that combine timber and crops. However, historically these systems have operated informally, creating legal challenges for these producers. Amapá's government attempted to develop a forest policy that would support such small-scale forestry, benefitting local families and motivating forest conservation. Despite efforts to create enabling conditions to formalize an existing timber supply chain, significant barriers still exist. For State institutions, these included low technical capacity and lack of logistical and financial resources, coupled with overlapping and/or unclear institutional mandates among the government agencies responsible for overseeing forest management and land titling in floodplain areas.

The Amapá case illustrates that cross-sector and cross-jurisdictional policy coherence, and the political will within agencies to adopt innovative approaches to formalization in the forestry sector are critical for success. Barriers for small-scale timber producers centre on the continued complexity of compliance with State regulations and the poor dissemination of information regarding new requirements. The Amapá State forest governance structure is relatively recent and still struggles to define responsibilities and to have an adequate number of staff to perform its activities. The lack of appropriate legal norms and mechanisms governing small-scale forest management denies forest owners legal access to formal markets with severe consequences for both local livelihoods and forest conservation.

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Six years of industrial logging in Ngoyla (East-Cameroon): what have been the outcomes for local populations?

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HIGHLIGHTS

- The industrial exploitation of Cameroon's forests was until the late 2000s, credited with little positive impacts on the communities living near logging concessions. From this period, factors likely to create an enabling environment more conducive to local development emerged.
- Immigration linked to logging has led to increased pressure on infrastructure, equipment, and human resource in basic social areas (health and education). However, the positive impacts of this activity on these areas are insignificant.
- Through the installation of a new ferry on the Dja river, the improvement of physical accessibility to Ngoyla, immigration linked to job opportunities and salaries paid to employees, industrial logging has boosted significantly the economy of this subdivision.
- The situation of Baka Indigenous people in general deserves special attention in relation to negative impacts. The Baka received very few positive spinoffs while more than other social components, they suffered from the degradation of forest resources caused by logging.
- After six years of logging in Ngoyla, the results in terms of positive socio-economic impacts at the local level are globally below expectations. While it could be argued that financial capital has increased in the subdivision, notable negative impacts were experienced in the natural, human, and social capitals.
- One of the significant reasons for poor outcomes of industrial logging is the gap between the regulations and the commitments on the one hand and what is practiced on the ground on the other.
- Forest populations generally have an ambivalent attitude towards industrial logging. They are divided between, on the one hand, the advantages that logging provides, such as improving accessibility and jobs, and, on the other hand, the disadvantages linked to this activity as well as the disappointments in relation to their expectations in terms of support for education, health and rural water supply.

SUMMARY

The industrial exploitation of Cameroon's forests was, until the late 2000s, credited with little positive impacts on the communities living near logging concessions. In order to evaluate the outcomes of logging for local populations and to inform the sustainable management of Ngoyla-Mintom forest block, socio-economic data was collected from 2011 to 2018. Data from guided interviews, observations and questionnaires reveal that local populations have seen improvements in their living conditions, particularly in terms of formal employment, better housing and increased mobility. The main adverse effects observed were a reduction of some forest resources, an increase in certain diseases, and increased violations of the rights of Indigenous People. Despite identified favorable factors, the positive impacts from industrial logging in Ngoyla are below expectations.

Keywords: industrial logging, socio-economic impacts, Ngoyla, forest resources, local populations

Six ans d'exploitation forestière industrielle à Ngoyla (Est-Cameroun): quels résultats pour les populations locales?

L. DEFO

Jusque vers la fin des années 2000, l'exploitation industrielle des forêts camerounaises n'a eu que peu d'impacts positifs sur les communautés vivant à proximité des concessions forestières. Dans le cadre de l'évaluation des retombées de l'exploitation forestière sur les populations locales et de la promotion de la gestion durable du massif forestier de Ngoyla-Mintom, des données socio-économiques ont été collectées de 2011 à 2018. Les données issues des entretiens, d'observations et de questionnaires révèlent que les populations locales ont connu des améliorations dans leurs conditions de vie, notamment en termes d'emploi formel, de logement et de mobilité. Les principaux effets néfastes observés ont été la diminution de la disponibilité des ressources forestières, l'augmentation de l'occurrence de certaines maladies et l'amplification des violations des droits des populations autochtones. Malgré les facteurs favorables identifiés, les impacts positifs de l'exploitation forestière industrielle à Ngoyla sont en dessous des attentes.

Seis años de explotación forestal industrial en Ngoyla (Camerún oriental): ¿cuáles han sido los resultados para las poblaciones locales?

L. DEFO

Hasta finales de la década de 2000, son pocos los efectos positivos atribuidos a la explotación industrial de los bosques del Camerún para las comunidades que vivían cerca de las concesiones de explotación forestal. A fin de evaluar los efectos de la explotación forestal para las poblaciones locales e informar la gestión sostenible del bloque de bosque primario Ngoyla-Mintom, se recolectaron datos socioeconómicos de 2011 a 2018. Los datos obtenidos de las entrevistas guiadas, observaciones y cuestionarios revelan que las poblaciones locales han experimentado mejoras en sus condiciones de vida, en particular en lo que respecta al empleo en el sector formal, la mejora de la vivienda y el aumento de la movilidad. Los principales efectos negativos observados fueron la disminución de algunos recursos forestales, el aumento de ciertas enfermedades y el incremento de las violaciones de los derechos de los pueblos indígenas. A pesar de los factores favorables identificados, los efectos positivos de la explotación forestal industrial en Ngoyla permanecen por debajo de las expectativas.

INTRODUCTION

Logging began in Cameroon at the end of the 19th century (Etoga 1971) and has occupied a strategic place in the Cameroonian economy since the 1980s (Topa *et al.* 2009). For example, in 2015, the formal logging sector extracted 2.7 million m³ of wood from the country (FAO 2017). Almost all production is exported to the European Union, China and Vietnam (Cerutti *et al.* 2009, FAO 2017). Logging contributes about 6% of the Gross Domestic Product¹ (MINFOF 2011) and has accounted for roughly 25% of the country's foreign exchange (Topa *et al.* 2009). In 2005, logging in Cameroon provided US\$ 80 000 000 in fiscal revenue to the government (Cerutti *et al.* 2009, de Wasseige *et al.* 2009). According to Cerutti *et al.* (2016), during the last two decades, the industrial forest sector realized an average annual turnover of about US\$ 600 million and in 2011 it contributed to the creation of about 23 000 formal jobs.

The importance of logging in Cameroon at the national level contrasts with the socio-economic benefits at the local level, which have been recognized as being rather mixed or disappointing (MINEF 1995, Bigombe Logo and Atamana 2004). This was recognized by the Cameroonian government in the framework of the forestry policy reform adopted in 1995, which stated; *"Although the populations enjoy usufruct rights, they do not have a substantial share of proceeds from the commercial exploitation of forest resources. Consequently, they do not feel concerned by the conservation of these resources"* (MINEF 1995:1). The government subsequently adopted the improvement of the local population's standards of living as one of the pillars of the new forestry policy (MINEF 1995a, 1995b, Lescuyer *et al.* 2012). Across Central and West Africa, many governments have similar expectations about the forest industry's contribution to local development (Karsenty 2007, Alemagi and Nukpezah 2012). However, research carried out in Cameroon during the decade following the start of the implementation of forest reform unfortunately

shows that the positive impacts of logging on local development remain weak and disappointing (Hakizumwami and Milol 2000, Bigombe Logo and Atamana 2004, Counsell *et al.* 2007, Topa *et al.* 2009, Lescuyer *et al.* 2012). This result has also been observed for other countries in the Congo Basin (Mengho 2003, Mengue Medou and Waaub 2005, Alemagi and Nukpezah 2012). Most of the above-mentioned authors attribute these results to a range of factors including inadequate regulatory framework, poor governance, poor legal and regulatory framework, lack of enforcement, culture of impunity, lack of participation, weak governance, inequitable sharing and utilization of forest revenues, poor quality of forest management plans (FMP), and lack of organisation on the part of communities.

Although assessments of the socio-economic impacts of logging on neighboring populations until the end of 2000s suggested failures or mixed outcomes the new context, beginning in the early 2010s, which allowed for broadly positive socio-economic impacts, indicated the need for a new evaluation. The perceived change in the logging environment came from (a) the improvement of the normative framework and enabling conditions for law enforcement, (b) the strong and influential presence of numerous support structures (see below), and (c) other factors including:

- The signing in 2010 by Cameroon and the European Union of the VPA-FLEG (Voluntary Partnership Agreement-Forest Law Enforcement Governance and Trade).
- The adoption by the government in 2010 of a new decree governing the management of the share of annual forest royalties (AFR) for municipalities and communities neighbouring forest concessions.
- The adoption in 2012 of specific technical, environmental and social obligations (*"cahier de charges"*) for logging companies operating in the Ngoyla-Mintom forest block.

¹ Cerutti *et al.* (2016) estimated that from 2008 to 2011, the formal forest industry contributed for about 1.5% of the Gross Domestic Product of Cameroon.

- The entry of an increasing number of civil society organizations in the independent observation (external) of the forestry sector. This process was consolidated in 2015 with the use by civil society organizations (CSOs) of a standardized external independent observation system (SNOIE).

The support structures mentioned above refer to:

- Technical support, from the beginning, to the logging operation of large-scale actors in Ngoyla-Mintom with the aim of promoting sustainable forest management (SFM). These actors are the Ngoyla-Mintom Technical Operation Unit (TOU) created by the Prime Minister and two major technical support projects. These projects are the WWF(World Wide Fund For Nature)-EU(European Union) Ngoyla-Mintom Project² mainly financed by the EU and implemented by WWF Cameroon and Projet Ngoyla-Mintom³ funded by the GEF (Global Environment Facility) and the World Bank and executed by the Ministry of Forests and Wildlife (MINFOF).
- The intervention in the Ngoyla-Mintom area from the beginning of 2010s of about 15 civil society organizations (CSOs). This was an exceptional concentration of CSOs in an area whose economic and environmental stakes were growing in the national context. These interventions were directly or indirectly supported by the presence of three international organizations: WWF, IUCN (International Union For Conservation of Nature) and the FPP(Forest Peoples Programme).

The other assets or enabling factors not necessarily found elsewhere in Cameroon included: the late arrival of logging⁴, the particular context of attribution of forest management units (FMUs) in the Ngoyla-Mintom forest block, the existence of investment planning frameworks and the size of the logging companies involved.

The transformative potential of the elements mentioned above forms the central research issue of this study: what are the socio-economic impacts of industrial logging in this new environment generated by the improvement of the normative framework, the presence of numerous support structures and other potentially enabling factors? The hypothesis examined was that the combination of these novel factors should lead to broadly positive socio-economic impacts of logging on populations in the study area of Ngoyla, and that in contrast to previous outcomes experienced by other populations, these factors should permit Ngoyla to avoid certain negative impacts or at least to limit their extent. The testing of this

hypothesis is at the center of this paper and was carried out at the levels of, (1) demography, education and health, (2) infrastructure and equipment, (3) economy, (4) social, political, administrative and cultural levels and (5) natural resources related to people's livelihoods.

CONTEXT OF THE STUDY

Background of the study

Industrial logging in Ngoyla takes place within the framework of concessions which are instruments for the management of natural resources in general and forest resources in particular and which have long been the subject of controversy. This controversy focuses in particular on how concessions impact the environment, the rights and livelihoods of communities and how they contribute to the national economy (Karsenty and Hardin 2017). Regarding socio-economic impacts, it is generally recognized that concessionaires provide people with collective social services, jobs and income-generating activities, but it is generally accepted that concessions have failed to reduce poverty (Karsenty 2007, 2016, Counsell *et al.* 2007). In Central Africa, this general observation appears to be particularly evident. For example, in a review of around thirty studies carried out in six countries of the Congo Basin including Cameroon, Alemagi and Nukpezah (2012: 44) refer to "*abject poverty in logging prone communities*" and cite as examples of adverse environmental and social impacts, issues related to social cohesion, the marginalization of communities, the erosion of culture, the increase in sexually transmitted diseases, alcoholism and other health impacts, the shortage of land for communities, poaching, pressure on wildlife, soil erosion, deforestation and pollution. Based on these observations, many scholars have raised questions about the value of the current forest management model (Lescuyer *et al.* 2012)⁵.

With regard to Cameroon, Defo *et al.* (2013) studied twenty works (reports, articles, presentations) published between 1984 and 2010, and gave a brief account of the negative socio-economic impacts and benefits of logging at the local level. Negative impacts identified included: significant population growth at logging sites, increased pressure on natural resources, conflicts between local stakeholders, exacerbation of political rivalries⁶, a loss of social cohesion, increased school dropout rates, a rise in the cost of living and increased marginalization of Indigenous populations. The main positive impacts identified were jobs, income, improved transport conditions, support for education, improvements in health and development of sport activities, housing improvements, access to potable water and the development

² Projet «Réduction de la déforestation et de la dégradation dans le Massif Forestier de Ngoyla – Mintom par la mise en œuvre d'une gestion durable intégrée dans le cadre du paysage tri-national Dja- Odzala-Minkebe (TRIDOM)».

³ «Projet de conservation et d'utilisation durable des ressources forestières et fauniques du massif de Ngoyla-Mintom».

⁴ Industrial logging arrived in the neighboring districts of Ngoyla between the 1980s and 1990s

⁵ Lescuyer *et al.* 2012 referred to Molnar *et al.* 2010, Counsell 2007 and Wilson 2007.

⁶ This is the example of the tough competition that exists for the position of mayor in forest municipalities.

of small-scale economic activities. The authors found that industrial logging has mixed socio-economic outcomes, emphasizing the scant contribution of this activity to local development and the failure of industrial logging to meet expectations for the development of communities (Bigombé Logo and Atamana 2004). The literature on the impact of logging on local populations in Cameroon is “*dominated by an observation of failure*” (Defo *et al.* 2013). However, from the beginning of 2010s, some new elements that could, in theory, provide at least some solutions to these issues have come into play.

In 2010, Cameroon and the European Union signed the VPA-FLEGT (Voluntary Partnership Agreement-Forest Law Enforcement, Governance and Trade), a legally-binding trade agreement which held logging companies to stricter legal standards, and included provisions for improving forest governance and management. The implementation of the VPA-FLEGT is expected to have positive impacts on populations that neighbor logged forest concessions through effective law enforcement at environmental, social and economic levels. It is generally assumed that by improving governance in the forestry sector and law enforcement FLEGT-VPA may have positive impact on livelihoods and social sustainability of forest-based communities (Beeko and Arts 2010, www.vpaunpacked.org/vpa-principles). However, it is also important to note that some authors have recognised the potential negative impacts of VPAs (Wiersum and van Oijen 2010, Ramcilovic-Suominen *et al.* 2010, Wiersum *et al.* 2013). For example, Carodenuto and Ramcilovic-Suominen (2014) drew attention to the perceived barriers to the implementation of the VPA, while Bigombé Logo (2015) also mentioned the difficulties of implementation, at the same time highlighting the progress made. FERN (2016) noted that the VPA has resulted in an improvement in forest governance at the levels of accountability, coordination, transparency, stakeholder participation and stakeholder capacity. Cerutti *et al.* (2020) presented some relevant narratives on VPA impacts and noted that many VPA-related targets have improved over time with positive VPA contribution.

As mentioned above, one of the potential solutions to the problem identified concerns the sharing of forest royalties. As part of the forest reform of the 1990s, the Cameroon government decided to share the forest royalties (area tax) between the public treasury, municipalities and neighboring villages where logging activities are located. The government consider AFR as a tool to promote the development of localities where industrial logging takes place. The use of these funds is framed by a text generally known as the Joint Order or Joint Decree. The Joint Order No. 000122 / MINEFI / MINAT of 29 April 1998 which governed the management of AFR until 2010 had a limited impact on local development (Bigombé Logo 2003, Topa *et al.* 2009, Eloundou 2010, Cerutti *et al.* 2010, Cerutti *et al.* 2016) and was replaced in 2010 by Joint Order No. 520 / MINADT / MINFI / MINFOF of June 3, 2010, which was supposed to have greater positive impacts on populations living near logged forests. With the aim of improving this management framework, another regulation (Joint Decree N ° 076 MINATD / MINFI / MINFOF) was

made on June 26, 2012 to replace that of 2010. The joint decrees of 2010 and 2012 introduced important new elements (including the roles of mayors and the composition and operation of local management entities) in the management of AFR compared to the joint decree of 1998. The drafting of the 2010 and 2012 regulatory texts also differed in that they included a significant involvement of civil society organizations (CSOs). CSOs began to get more involved in the independent monitoring of logging around the same time.

Official independent observation of logging in Cameroon began in 2000 and lasted until the end of 2013. This means that at the beginning of the 2010s, it could be said that official independent observation had reached a mature phase and the contribution of independent external observation should have made it possible to strengthen its achievements. Around 2003, the Center for the Environment and Development (CED), a national NGO, embarked on independent forest observation with the financial support of several European NGOs. This was an external observation (without a mandate from the Government) with the aim to identify and denounce infringements observed in the process of attribution and management of logging titles, with the strong participation of the local communities (Kamga 2013). From around 2010, the CED was joined in this work by an increasing number of national NGOs (FODER, CAFER, PAPEL, CEFAID), most of the time acting with the support of external donors. This involvement of CSOs was consolidated around 2015 by the establishment of an External Independent Observation Coordination and the use of the approach of the SNOIE certified ISO 9001-2015. Their contribution towards improving respect for the law and transparency in the sector has been significant. This contribution was timely for Ngoyla since the significant entry of CSOs into independent observation roughly coincided with the start of industrial logging in this subdivision.

Industrial logging began in Ngoyla in 2012, more than a century after the start of this activity in Cameroon and more than 15 years after the allocation of the first Forest Management Units (FMUs) in the country. As a result, Ngoyla could have learned from the difficulties faced by other forest sites which had attempted to limit negative impacts and maximize the positive effects of this activity on their people. Moreover, the arrival of logging in this significant remaining forest block in Cameroon took place in the context of lively debates, and even controversy, which pitted those in favor of Payments for Environmental Services (PES) as a means of value-creation for most of the Ngoyla-Mintom forest block against those who defended industrial logging as the best option for the area. For the proponents of logging, led by the government, the absence of logging in Ngoyla was cited as a reason for the low levels of local development and was seen as detrimental to both local populations and the national economy (Ongolo and Badoux 2017). Logically, this argument implied that industrial logging would cause the government to make improvements to the living conditions of the Ngoyla populations in order to show the opposing side that its choice of assigning FMUs to logging was the best option. In order to show good faith in this climate of controversy, and following the lobbying undertaken by WWF and the European Union in

the framework of WWF-EU Ngoyla-Mintom Project, the government included innovative clauses regarding the technical, environmental and social obligations of logging companies operating in the Ngoyla-Mintom forest block in 2012. These innovative clauses⁷ required that companies make their legal obligations known to the public, participate in a synergy platform between stakeholders in the area (Article 20) and take special measures to protect wildlife. Moreover, apart from the monitoring by traditional services of the Ministry of Forests and Wildlife (MINFOF), the government instituted another innovation: the local monitoring and evaluation of these obligations. Projet Ngoyla-Mintom, was mandated to do this work, as well as, to provide support to logging stakeholders alongside Ngoyla-Mintom TOU and WWF-EU Ngoyla-Mintom Project.

Contrary to what has generally been the case elsewhere in Cameroon, right from its beginning, logging operations in Ngoyla-Mintom have directly and indirectly benefitted from the support of large-scale actors, namely the Ngoyla-Mintom TOU and two major field projects funded by international cooperation. Indeed, in 2013, thanks to the lobbying of international partners, the Prime Minister created the Ngoyla-Mintom TOU (Order No. 1017 / PM of 20 February 2013) whose main mission was to promote the sustainable management of the Ngoyla-Mintom forest block. The WWF-EU Ngoyla-Mintom Project and Project Ngoyla-Mintom contained various field initiatives aimed at enhancing the potential for positive outcomes from logging at the local level. These included strengthening the technical and organizational capacities of logging stakeholders and those managing the AFRs, establishment of a platform for developing synergies between stakeholders, facilitating the establishment of Village Forest Management Committees (VFMC), and addressing poaching and promotion of SFM. These projects also benefited from the presence of numerous CSOs⁸ that were encouraged to operate in the area or were already active there. Mining prospecting and the debate around the management of this forest block had led many CSOs based in Yaoundé, Yokadouma, Bertoua, Lomié and Djoum to work in the area from the end of the 2000s. This exceptional concentration of CSOs was supported by the significant presence of international organizations such as WWF, IUCN and FPP. These organizations and CSOs should have, in principle in their roles as watchdogs, facilitators or capacity building actors, been instrumental in optimizing the positive impacts of logging on local populations. The expectation was that such role would be facilitated by the fact that almost all of the logging companies operating in Ngoyla were large (FIPCAM, SIM and STBK

are among the largest in Cameroon in terms of total areas managed and/or volumes of timber exported (FAO 2017))⁹ as these companies should, at least in theory, have had a relatively large technical and financial capacity to meet regulatory obligations and thereby implement SFM.

It is generally accepted that large forestry companies are more able to meet social obligations than small and medium-sized enterprises due to their wider financial opportunities and their concern about maintaining their reputation vis-à-vis their European consumers and partners (Karsenty 2007). Moreover, in Ngoyla, the contributions of these companies to local development should have been enhanced and facilitated by the fact that Ngoyla already had a communal development plan (2012) and village development plans (2015). These plans should, in principle, have constituted frameworks for federations of efforts, rationales for interventions and investments or for the construction of convergent representations between local development actors. It should be noted that according to Joint Decree N ° 076 MINATD / MINFI / MINFOF, the communal development plan constitutes the basic document defining the projects to which 70% of the share of AFR managed by the municipality must be devoted.

The ensemble of elements noted above is expected, to some degree, to provide solutions to failed aspects previously mentioned and/or create a new environment that can influence the nature, intensity and extent of the socio-economic impacts of industrial logging. For example, in a study of logging in the Yokadouma area, Defo *et al.* (2013) identified the quality and monitoring of technical, environmental and social obligations of companies, the presence of CSOs and international cooperation, and the support to populations in the management of AFR as some key elements that could lead to a positive and significant contribution of logging to the improvement of the living conditions of the populations.

Study site: Ngoyla Subdivision and industrial logging

Ngoyla subdivision covers 4,382 km² (commune de Ngoyla 2012: 16) located between longitudes 13°38'E-14°35'E and latitudes 2°10'N-2°56'N. Ngoyla is part of the Eastern Region and Upper Nyong division of Cameroon (Figure 1). In 2010, Ngoyla had 4424 people¹⁰ divided among its 29 villages. The native populations of the area are Baka and Djem (respectively 15% and 65.2% of the population in 2015)¹¹. The rest of the population is comprised of immigrants. The Baka are Indigenous People living mainly from fishing, gathering, hunting and some agricultural activities. Djem are Bantu who depend mainly on agricultural activities but also carry out

⁷ See articles 16, 19, 20 et 22 of the provisional agreement of logging companies operating in the FMUs of Ngoyla-Mintom forest block.

⁸ OCBB, CAFT, OPFCR, APIFED, CERFE, AJDUR, CADEFE, OKANI, BiodivDja, CIAD, PERAD, CABURO, ASTRAD, IPRAPAF, CEF Dja, ASBAK.

⁹ In 2015, FIPCAM and SIM managed 193719 ha and 174300 ha of FMUs respectively, ranking respectively 7th and 9th at the national level (FAO 2017: 26). In 2015 SIM, STBK and FIPCAM exported respectively 266985, 103818 and 92677 cubic meters of roundwood equivalent and ranked respectively 1st, 10th and 11th at the national level (FAO 2017: 18).

¹⁰ BUCREP 2010.

¹¹ Defo *et al.* 2015: 10.

hunting, gathering and fishing activities. The Ngoyla people live mainly from agriculture, hunting, fishing, exploitation of non-timber forest products (NTFPs), artisanal mining and, since 2012, are engaged in industrial logging. Baka and Djem constitute communities with segmented socio-political structures, without any real rigid hierarchical structure of concentration of authority. The Baka are dominated and exploited from a social, political and economic point of view by the Djem and constitute a marginalized social group.

Ngoyla is part of the northwestern Congo Basin tropical rainforest and has a rich biodiversity (Usongo *et al.* 2007). Ngoyla forests constitute the bulk of the eastern part of Ngoyla-Mintom forest block. This forest block has had a turbulent history since the end of the 1990s because of differences of opinion concerning its allocation, leading Ongolo and Badoux (2017: 131) to describe this forest as a “*forest of discord*”. In fact, the Ngoyla-Mintom forest block was initially allocated to industrial timber logging (Decree No. 95-678-PM of 18 December 1995). But in 1998, under pressure from international partners including the World Bank, WWF and Conservation International, the government changed its mind and froze the allocation of this area to logging in favor of conservation (Ongolo and Badoux 2017). In 2006 and 2007¹², the government reconsidered this option (MINFOF 2006). From 2007 to 2012, the government and some of its partners began leaning towards a partial allocation of this forest block to logging and a partial allocation to conservation in return for financial compensation from the international community, in the framework of PES (Usongo *et al.* 2007). In April 2012, the Government of Cameroon issued a call for tenders for the allocation of FMUs of these forest blocks for logging or for conservation of biodiversity¹³. For a month and a half, a lively debate took place between the defenders of logging on the one hand and proponents for the conservation of biodiversity and PES on the other hand. The first camp was led by MINFOF, supported discreetly by logging companies and some local elites, while the second bloc was led by WWF and EU and supported by IUCN, REDD+ promoters and some local CSOs. This debate focused on arguments and counter-arguments regarding the financial, socio-economic and environmental benefits of each of the options at the local, national and international levels and lasted until the publication of the results of the call for tenders on 28 August 2012. At the end of this process, 58.21% of the permanent forest estate of this area was allocated to logging (FMU and council forest). Regarding Ngoyla in particular, only 28.10% of its permanent forest estate was allocated to biodiversity conservation.

In the last quarter of 2012, industrial logging started in Ngoyla and since 2013, four logging companies have been operating in Ngoyla FMUs and Ngoyla Council forest (Figure 2). These are FIPCAM (FMUs 10-035 and Ngoyla

Council Forest), SIM (FMUs 10-027, 10-032 and 10-036), STBK (FMU 10-028) and GRACOVIR (FMUs 10-033 and 10-067). In addition, GRACOVIR has the only industrial wood processing unit in Ngoyla.

Industrial logging began in the Ngoyla-Mintom forest block within the context of widespread poverty as mentioned by Defo (2017: 7): “*Despite the richness of the environment, its inhabitants live mostly below the poverty line where the level of human development is very low and basic equipment and infrastructure are insufficient. For example, in 2012 there was one source of potable water for an average of 448 people and 61% of the houses were made of provisional materials*”. In such an environment some people saw logging as a way to boost Ngoyla’s development based on the hope that forestry companies would have a direct impact on jobs, health, education, culture, equipment and infrastructure, and on the AFR. According to Article 66 of Law No 94/01 of 20 January 1994 and Article 18 of the agreements between the government and logging companies operating in Ngoyla-Mintom, these companies must contribute to improving the livelihoods of local populations and to the construction of socio-economic infrastructure, in addition to the payment of the AFR. The local council and population’s share of AFR is significant in Ngoyla (average of US \$ 1 160 000 a year) and constitutes more than 80% of the council’s budget¹⁴.

METHODS

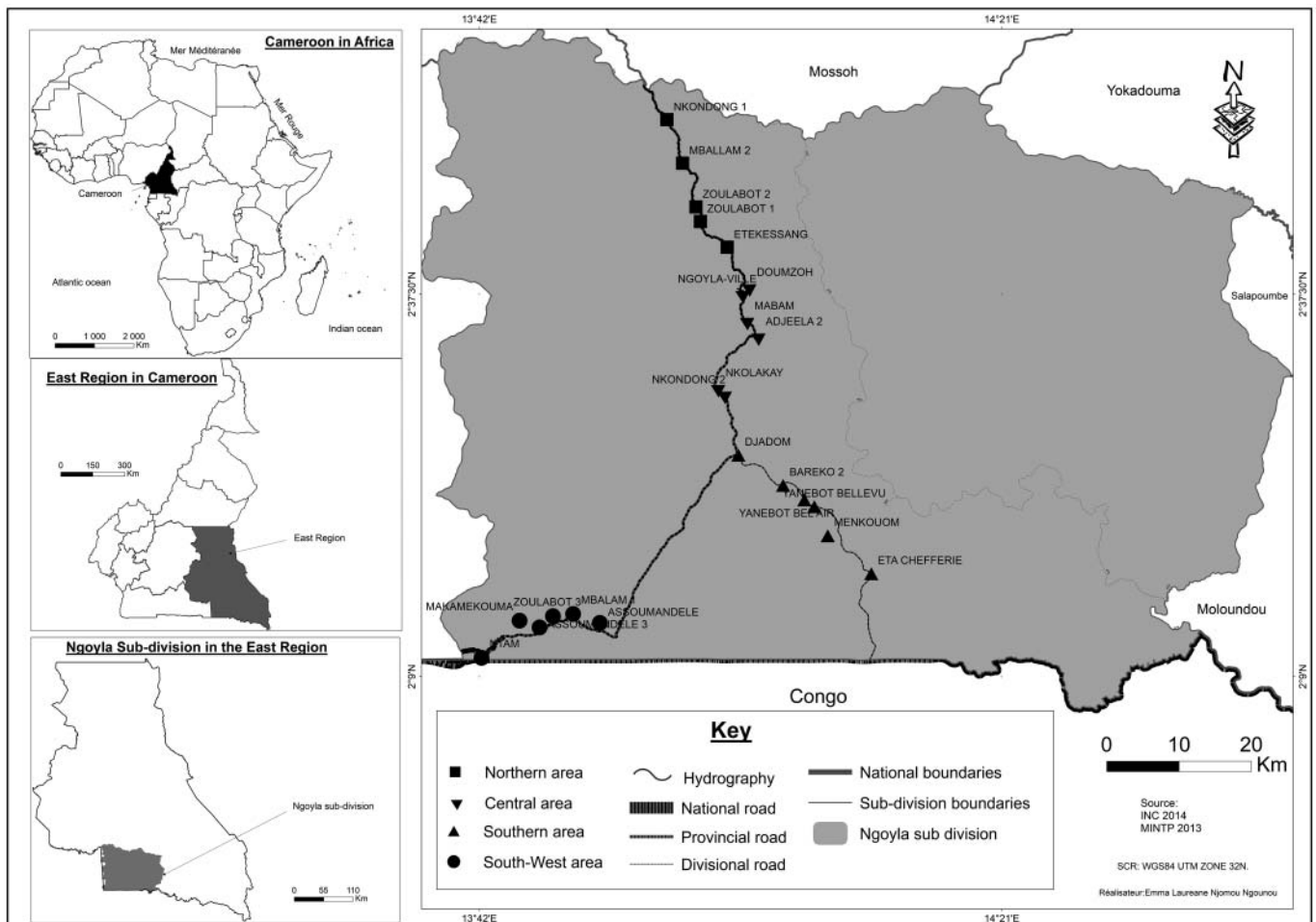
As part of the monitoring of socio-economic dynamics in the Ngoyla-Mintom area, data were collected in the framework of WWF-EU Ngoyla-Mintom Project between 2011 and 2017 using the participatory rural appraisal approach. In 2018, a specific survey on the socio-economic impacts of logging in Ngoyla was conducted. This survey used standardized questionnaires, interview guides, survey sheets, direct observations and focus group discussions. The components of the survey were designed to take into consideration concerns expressed through the SDGs (Sustainable Development Goals) as well as the national strategy for combating poverty as set out in the Growth and Employment Strategy Paper (GESP) and the promotion of local development via logging (MINEF 1995b). These components included health, education, water, forests, poverty, infrastructure and governance and also reflect the areas of interest and/or indicators contained in similar works (Auzel 2001, Bigombe Logo 2004, Defo *et al.* 2013, Endamana *et al.* 2010, Lescuyer *et al.* 2012, Mengue, Mbairamadji 2006, Medou and Waaub 2005) even if the present study does not aim to compare the results in these areas of interest with those obtained elsewhere. Many of these variables falls under three of the asset categories identified by the Sustainable Livelihoods Framework (Scoones 1998, Serrat 2010), namely human, natural and physical capital.

¹² Decision N°0836/MINFOF/D/MINFOF/SG/DF/DFAP of September 5 2007.

¹³ Call for tender n°0099/AO/MINFOF/SG/DF/SDAFF/SDIAF/SAG/SC of 16 April 2012. This call for tender was modified on May 30, 2012 by call for tender n°0150/AO/MINFOF/SG/DF/SDAFF/SDIAF may 30, 2012.

¹⁴ Maire de Ngoyla 2015, 2016, 2017, 2017.

FIGURE 1 Location map of Ngoyla subdivision



As part of the 2018 survey, a standardized questionnaire was administered to 7.5% of adults (186 person of 20 years and above)¹⁵ of the Ngoyla population. To take into account the diversity of sociological and socio-economic characteristics in different parts of Ngoyla, the sampling was conducted across the north, center, south and south-west zones of the subdivision (Figure 2) in proportion to the adult population of each of these areas. In each survey zone, the selection of informants was random but took into account the need for the representativeness of women and the Baka Indigenous population (stratified random sampling, women and Baka representing respectively 49% and 15% of the population in 2015)¹⁶. Three focus group discussions were conducted in each of the survey areas and one-to-one interviews were conducted with twenty key informants from several social, economic, administrative and cultural sectors of Ngoyla. These key informants include the administrative and traditional authorities, officers in charge of public security, local MINFOP officers, school and health officers, CSOs leaders, employees of logging companies, small business owners and informants without a specific socio-political or administrative position.

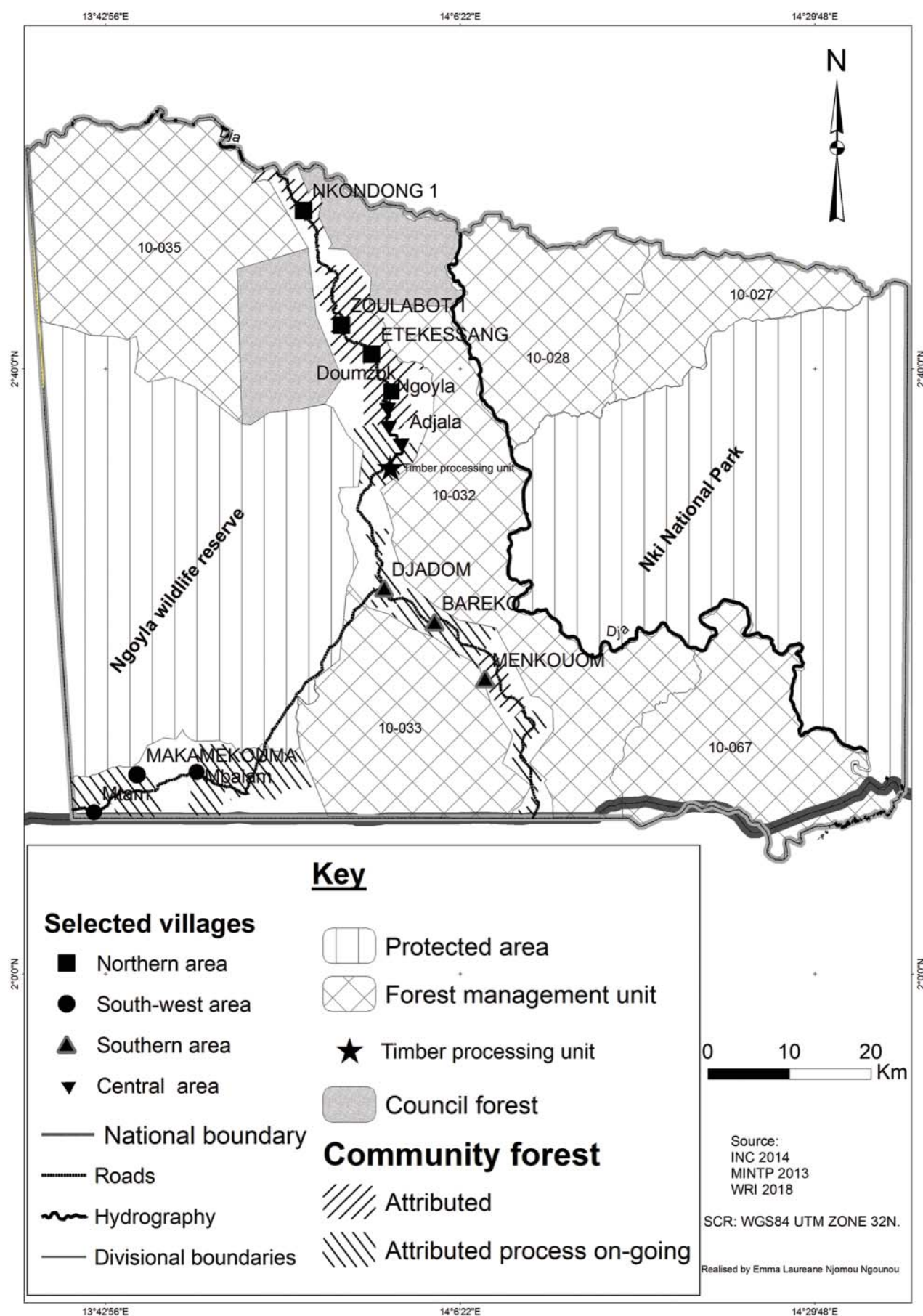
The identification of the socio-economic impacts of industrial logging was done mainly by comparing the pre-logging and the post-2012 situation, based on the indicators selected for each of the socio-economic components mentioned above. Measuring social impacts is difficult, in part because researchers rely on perceptions of people, an issue which can be imprecise or open to interpretation. In order to limit the potential for bias from peoples' own perception of the impacts, the study also recorded certain key indicators (e.g. number of zinc roofed houses, prices of basic commodities). In addition, attention was focused on changes arising from the direct or indirect actions of industrial logging, or simply those related to its presence. On another aspect, still with the aim of objectively identifying the impacts of logging, data from Mintom, one of subdivisions bordering Ngoyla, are mentioned as a comparison with those of Ngoyla. Industrial logging activities are older in Mintom compared to Ngoyla, but they are marginal in size compared to what is happening in Ngoyla.¹⁷ It is important to note that, apart from industrial logging, there is almost no other event that could have led to

¹⁵ According to Boum *et al.* (2016: 9–17), Ngoyla has 2,472 people of 20 years and above in 2015.

¹⁶ Data from proportions derived from figures from Defo *et al.* (2015: 8–12) and Boum *et al.* (2016: 9–17).

¹⁷ Industrial logging started in Mintom in 1997. It started in Ngoyla 15 years later (2012). Mintom has only 112,163 ha granted in industrial logging (Ngoyla has 364,559 ha), 2 logging camps (Ngoyla has 6) and no sawmill (Ngoyla has a sawmill).

FIGURE 2 Map of land allocation in Ngoyla



large-scale socio-economic changes in Ngoyla between 2012 and 2018. Thus, for more than six years, industrial logging has been the most important factor influencing socio-economic dynamics in Ngoyla.

RESULTS

Demography, education and health

Between 2011 and 2015, the population of Ngoyla (Figure 3) increased from 4 428 to 4 848 (Boum *et al.* 2016: 12) with an average annual growth rate of 2.26% (compared with -3.51% for Mintom during the same period.)¹⁸ Between 1965 and 1987 this rate was 1.78% and from 1987 to 2010 it was 2.28%.

Between 2006 and 2011, there was significant immigration to the southwestern part of Ngoyla (Defo 2016) due to mining exploration¹⁹, and the cessation of this activity (2012–2014) led to a huge emigration of population in this area. Indeed, industrial logging caused massive immigration to Ngoyla, but this demographic increase was counterbalanced by strong emigration in the southwestern part of this subdivision between 2012 and 2015. This becomes clearer when one compares the growth rate of the southwestern part (more than 40 km away from the main current wood exploitation sites) with that of the rest of the subdivision between 2011 and 2015 (-2.82 % against 2.57%).

Despite this population growth, there was almost no improvement in education infrastructure and human resources. Indeed, an overwhelming majority (almost 90%) of the Ngoyla population indicates that industrial logging has had no positive impact on the quality of education. The changes in teacher/pupil and classroom/pupil ratios (Table 1) corroborates assessments made by the population. In Ngoyla, the teacher / student ratio went from 43.8 to 56.9 between 2011

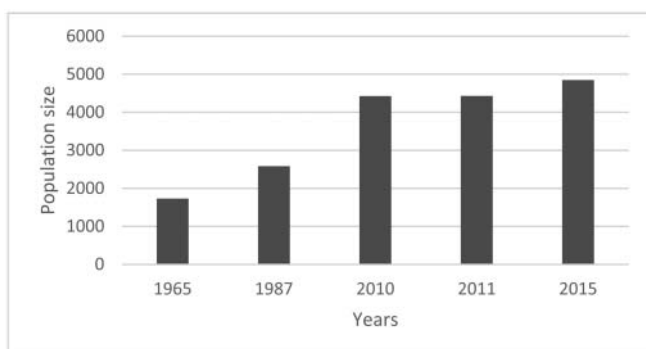
and 2015 while in Mintom, it went from 18.3 to 21.5 during the same period (Boum *et al.* 2016: 19–26). Indeed, in six years of presence in Ngoyla, logging companies have built only one classroom and have no teachers under their financial responsibility. Moreover, the AFR paid by these companies has not made it possible to reduce crowding in the classrooms or to increase the level of supervision of the pupils. On the contrary, immigration caused by logging has increased the pressure on school's infrastructure and staff, despite the efforts made by other actors to build classrooms²⁰ and to pay teachers. The negative impacts of logging on education also translate into increased school dropout as attested by school officials and the general population. In fact, almost 50% of respondents believe that logging increases school dropout due to the increase in the level of delinquency and early departure from school because of employment opportunities with logging enterprises. Interviews with officials of government secondary technical and government high schools of Ngoyla corroborated this observation obtained from the questionnaire.

Similar negative outcomes are observed in the health sector. In fact, the doctor of the Ngoyla Medical Center reports an increase in cases of sexually transmitted diseases (STDs) and abortion. Over half (56.2%) of respondents indicate that logging is responsible for this greater occurrence of STDs (Figure 4). Less than half (44.8%) of respondents think that logging has led to the emergence of “*new diseases*” such as hernia which could be linked to the transport of heavy loads in the sawmill and respiratory infections due to dust raised by trucks (but 62.6% of respondents think that logging has no impact on the occurrence of respiratory diseases -RDs- as shown in Figure 4). Additionally, immigration has increased pressure on health personnel (in Ngoyla, the health staff/population ratio went from 553.5 to 969.6 between 2011 and 2015 while in Mintom, it went from 220 to 369 during the same period)²¹, infrastructure and equipment. As a general assessment, 94.6% of populations consider that logging has no positive impact on the quality of public health. It is however important to mention one positive aspect, that the mayor of Ngoyla noted that the hospital of Ngoyla gained equipment thanks to the AFR, even if the doctor of this hospital indicated that this investment is insignificant (less than US \$ 4000) compared to the needs and the huge amounts of AFR paid to Ngoyla.

Infrastructure and equipment

In terms of material well-being, improvements have been made in Ngoyla for several recorded indicators from 2011 to 2015, although not for access to radio and TV receivers (Table 2). In Mintom during the same period all indicators improved. It should however be noted that in Ngoyla, the acquisition of motorbike and mill was more important than in

FIGURE 3 Population trend in Ngoyla between 1965 and 2015



Sources: ORSTOM 1968 (data of 1965), RGPH 1987 (data of 1987), BUCREP 2010 (data of 2010), Boum *et al.* 2016 (data of 2011 and 2015)

¹⁸ Boum *et al.* 2016: 12–14.

¹⁹ Mineral exploration activities in this area were conducted by CamIron and Cameroon Mining Company (CMC).

²⁰ The National Participatory Development Program and WWF also built classrooms in Ngoyla.

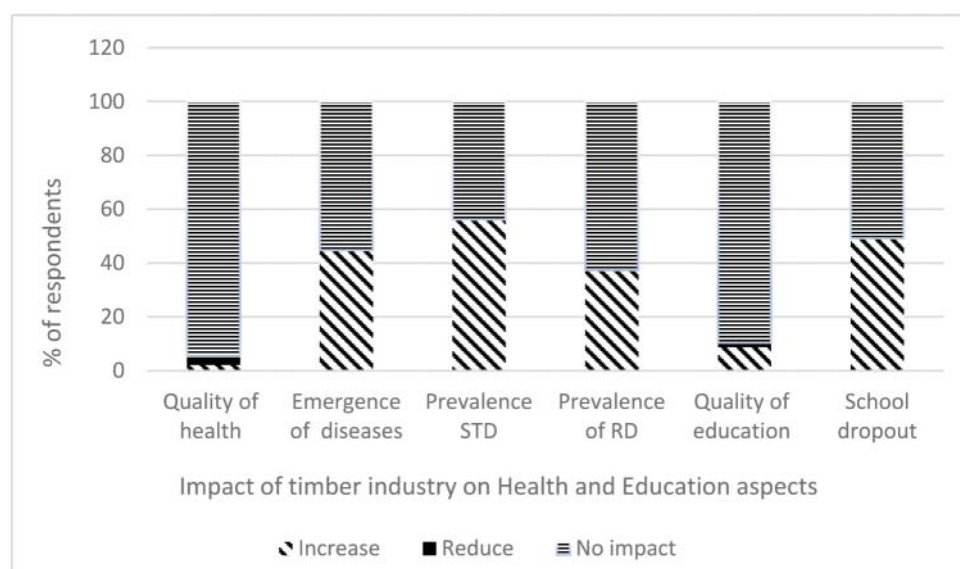
²¹ Boum *et al.* 2016: 19–26.

TABLE 1 Some key education and health indicators in Ngoyla between 2011 and 2018

Education and health indicator	Year		
	2011**	2015**	2018
Population size	4 428	4 848	
Number of primary and nursery schools	11	11	14*
Teacher/student ratio in primary and nursery education	43.8	56.9	97.89***
Classroom/student ratio in primary and nursery education	39.6	51.8	80.6***
Number of health staff	8	5	7*
Health staff/population ratio	553.5	969.6	
Timber companies' direct investment in public education in Ngoyla		01 classroom*	
Timber companies' direct investment in public health service in Ngoyla		00*	

Sources: *field work, **Boum *et al.* 2016, ***IEPM of Ngoyla

FIGURE 4 Impacts of timber industry on some health and education aspects in Ngoyla



Source: Field Work, 2018

Mintom (In Ngoyla the number of people per motorbike was reduced by 46.8% between 2011 and 2015 against 13.1% in Mintom and the number of mills was reduced by 58.9% in Ngoyla against 42.1% in Mintom during the same period) to meet immigration and the consequent demand for service (Defo *et al.* 2015: 23, Boum *et al.* 2016: 59–64). Improvements can be directly or indirectly attributed to logging's stakeholders and to other actors such as WWF-EU Ngoyla-Mintom project and the Projet Ngoyla-Mintom. Thus, for example, the increase in the number of cocoa sprayers is due not only to the purchase of sprayers by logging companies' employees for the maintenance of their cocoa farms (native employees) or the cocoa plantations that they rent, but also linked to the promotion of cocoa production by WWF-EU Ngoyla-Mintom project and the Projet Ngoyla-Mintom. Thanks to logging companies' direct investment, the mayor using AFR and Projet Ngoyla-Mintom (they built three and five wells respectively), the number of wells increased but due to lack of maintenance, the life span of a well rarely

exceeds 6 months and that is why 91.4% of those surveyed think that logging has no impact on access to drinking water (Figure 5).

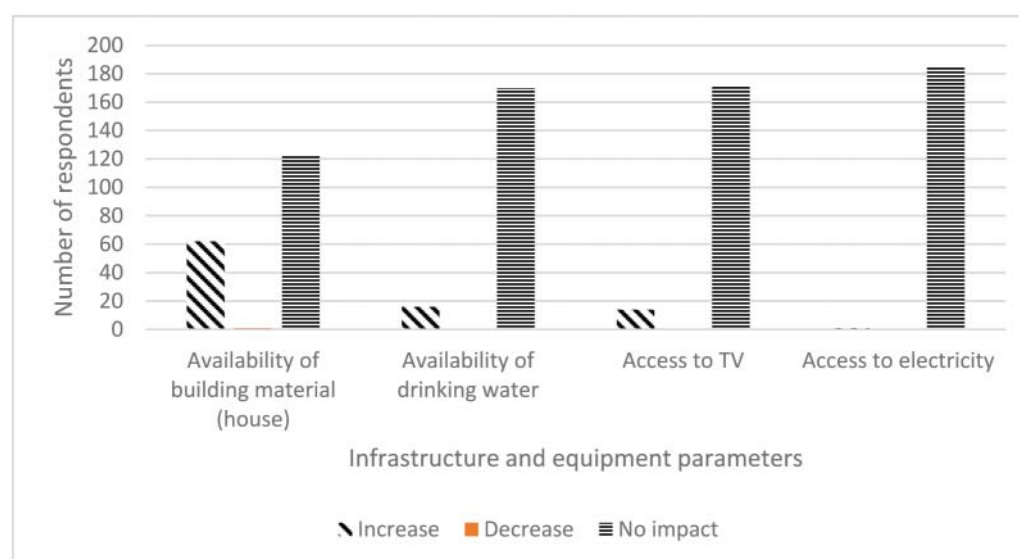
The ferry installed by logging companies on the Dja river in 2013 is unquestionably one of the investments with strong socio-economic impacts of these companies in Ngoyla. This new ferry, built and maintained by two logging companies (SIM and FIPCAM) with their funding has significantly improved connections between Ngoyla and other parts of Cameroon by maintaining regular traffic and reducing the crossing time by almost half. It is important to note that people use this ferry for free and are very grateful for it, as expressed by the traditional chief of Ngoyla village: "The only thing that we benefit [from logging] today is that it is now possible to go to Lomié and return the same day thanks to the ferry of the logging companies".

Apart from impacts related to the direct interventions of logging companies, the AFR managed by the mayor could have, in principle, considerably improved the level of

TABLE 2 *Some key infrastructure and equipment indicators in Ngoyla between 2011 and 2015 (with reference to the situation in Mintom for certain aspects)*

	2011***		2015**	
	Ngoyla	Mintom	Ngoyla	Mintom
Population size	4 428	3 410	4 848	2 962
Number of inhabitants per radio receiver	11.8	15.9	29.7	12.9
Number of inhabitants per TV receiver	29.9	48.7	44.9	29.9
Number of inhabitants per corn or cassava mill	738	1 705	303	987
Number of inhabitants per cocoa sprayer	24.5	25.5	22.5	22.1
Number of inhabitants per motorbike	47.1	32.2	25.3	27.9
Number of inhabitants for a well	316.3	126.3	269.3	105.8
% of house having a sheet metal roof	33.5	39.1	36.3	44.7
% of house built of sawn wood	1.29		2.53	
Number and functionality of ferry on Dja river (Ngoyla)	1. Manual traction, very slow and often down		1. Mechanical traction, rapid and rarely broken down.	
Timber companies' direct investments in collective infrastructure and equipment in Ngoyla (2012–2018)	Construction of 1 ferry and 3 wells, involvement in the construction or rehabilitation of 3 sheds, occasional road maintenance (Ngoyla-Nkongdong and Ngoyla-Ntam)			

Sources: Field work 2018 (data on ferry and timber companies' direct investments), **Defo *et al.* 2015 and ***Boum *et al.* 2016

FIGURE 5 *Impacts of timber industry on some infrastructure and equipment parameters in Ngoyla*

Source: Field Work, 2018

equipment and infrastructure of Ngoyla. But, it was noted that this important financial endowment has had only a modest impact in this area from 2014 to 2017 compared to the amount of AFR allocated to Ngoyla Council every year. Indeed, the performance report of the mayor cites as achievements made with the AFRs: “purchase of chairs for the council hall”, “rehabilitation of the official gallery”, “landscaping of public gardens”, “acquisition of equipment for the services of the town hall”, “completion of work of the municipal inn”, “repair of the generator”, “purchase of a pick-up Land cruiser

double cabin”, “maintenance of equipment”, “various supplies”, “construction of an annex building of five rooms for the services of the town hall”, “reconstruction of the old building housing the services of the town hall”, “construction of 5 wells equipped with PMH”, “Electrification of the annex offices of the town hall” and “purchase of 02 desktop computers for the services of the town hall” (Maire de Ngoyla 2015, 2016, 2017, 2018). This list shows not only that the achievements are insignificant compared to the amounts of the AFR (an average of more than US \$ 1 160 000 every year)²², but

²² Maire de Ngoyla 2015, 2016, 2017 and 2018.

also that money was squandered on inappropriate items which are far from the needs of the populations and the priorities defined in the Council Development Plan of Ngoyla (Commune de Ngoyla 2012).

Economic growth

According to 65.2% of questionnaire participants industrial logging has led to an increase in economic activities in Ngoyla through the increased purchasing power that logging provides its employees, improving accessibility and increasing demand for high-consumption products. Importantly, this means that logging has given Ngoyla an economic vitality that is fairly stable throughout the year, whereas formerly it was limited almost exclusively to the period of cacao sales (November-January). The construction in 2018 of a small shopping center in the town of Ngoyla is an indication of this improved economic activity. Moreover, thanks to logging, Ngoyla is more integrated than before to national and international economic networks, as shown for example by the increased recruitment basin of this activity and the destination of the wood it produces. Logging has created 246 direct jobs in Ngoyla and is therefore the largest employer of the non-state formal sector of this subdivision. Of this number, 40.7% are from the neighboring villages. This proportion of employees from neighboring communities is a good performance compared to the rates recorded in logging companies of Yokadouma by Mbairamadji (2006: 4) and Defo *et al.* (2013: 16) which are 32.17% and 27.6% respectively. From this point of view, the impact of logging on the fight against youth unemployment in the neighboring communities is positive.

Logging has also had a positive impact on the transportation sector. Through the installation of a faster and more functional ferry on the river Dja and the sporadic maintenance of the Ngoyla-Nkongdong and Ngoyla-Ntam roads by companies, the improvement of purchasing power and free transportation of some people, logging has made a very significant contribution to increasing the mobility of people (Figure 6) and the movement of goods in Ngoyla. Despite this improvement, the cost of transport in Ngoyla remains high (US \$ 0.07 to US \$ 0.08 per km on Ngoyla-Lomié road against for example US \$ 0.033 on Yokadouma-Bertoua road which is also a poorly maintained dirt road like the Ngoyla-Lomié axis). However, it should be noted that the rate of inflation over the period (nearly 1.8% on average in Cameroon)²³ justifies this increase despite the improvement in accessibility.

The increase in the prices of industrial or manufactured products such as soap, palm oil and kerozene can also be justified by this rate inflation. But, it is also important to note that the levels of increase were generally more significant in Ngoyla compared to those of Mintom between 2011 and 2016. So for example, the price of “33 Export” beer went from 1.8 to 2 US \$ for Ngoyla against 1.6 to 1.7 US \$ for Mintom; that of 400g soap from 0.8 to 0.9 US \$ for Ngoyla

against price stability for Mintom (0.8 US \$)²⁴. In fact, immigration in Ngoyla generated by logging has led to an increase in demand for highly consumed industrial or manufactured products and a consequent rise in their prices. In addition, by increasing the volume of cash in circulation in Ngoyla and by giving certain people (employees) a relatively high purchasing power compared to that of non-employed villagers, the wages paid by forestry companies generate an increase of prices of highly consumed industrial goods. This phenomenon, which was mentioned by people interviewed in Ngoyla, was also noted in Gabon by Mengue Medou and Waaub (2005) in the logging sites of the Leroy-Gabon company in Gabon.

The same reasons (population growth due to immigration, increase in the volume of cash and increase in purchasing power) justify the increase in the prices of agricultural high-consumption products such as plantain and cassava (Table 3, Figure 6). The magnitude of the increase in agricultural commodity prices (100% for plantain and more than 100% for cassava, for example, as shown in Table 3 compared to 33.3% for plantain and same for cassava in Mintom from 2011 to 2016) reflects a larger increase in demand. It should be noted that 19.9% of respondents believe that the arrival of logging has led to a reduction in the availability of agricultural products while 29.6% support the opposite point of view. Anyway, the increase in prices reflects the fact that agricultural production or supply has not increased at the same rate as the demand for food. Several reasons may be at the origin of this insufficient adjustment of supply to demand. These are, for example, the diversion of part of the agricultural workforce to industrial logging and the lack of agricultural inputs (according to 83.3% of the population, logging has had no impact on the availability of agricultural inputs)

Finally, at the economic level, the consequences of industrial logging can also be seen in services such as housing, catering and in trade as shown in Table 3 and Figure 6. A general increase in the number of inns, restaurants, bars and stalls/shops was observed in Ngoyla.

Social, political, administrative, cultural and sporting life

Results of the questionnaire and interviews show an increase in risk behaviours including the excessive consumption of alcohol and drugs (cannabis, tramadol, cocaine), theft and swindling, as well as an increase in risk sexual behaviors including promiscuity, adultery and sexual exploitation of young girls, resulting in unwanted pregnancies, abortions and divorces (Figure 7). In this regard, the Commissioner of Ngoyla elaborated that “*Several cases of divorce are reported. When logging truck drivers woo women, they abandon their marital homes. More cases of unwanted pregnancy are reported, the increasing consumption of drugs and alcohol, early sexuality.*” The priest of the Ngoyla Catholic Church

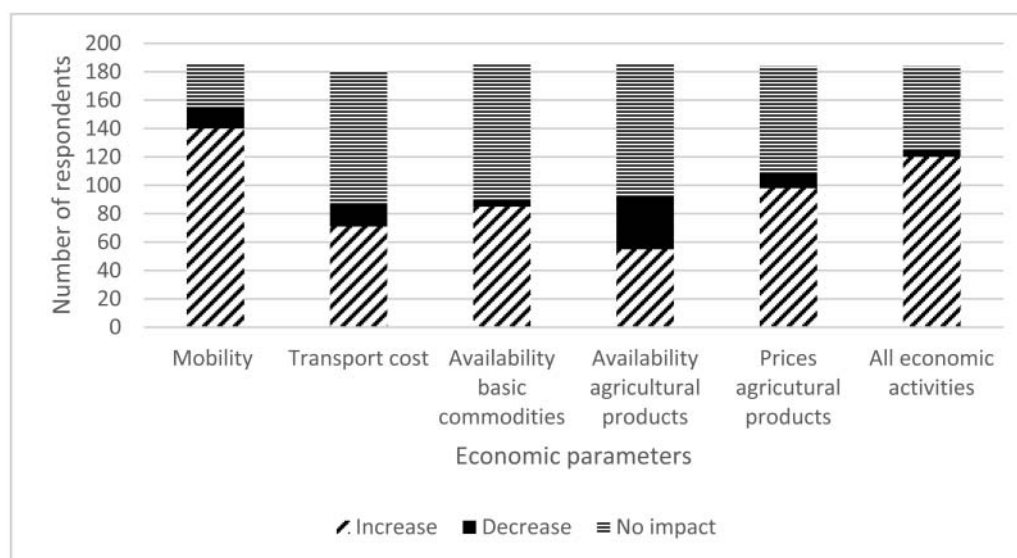
²³ National Institute of Statistics (INS) website (<http://www.statistics-cameroon.org/>).

²⁴ Fogue 2012: 36–37 and Defo *et al.* 2017: 31–32.

TABLE 3 *Some key economic indicators in Ngoyla between 2011 and 2018*

Economic indicator	Year	
	2011	2018*
Total Number of timber companies' workers	0*	246
Number of timber companies' workers from Ngoyla	0*	100
Number of inns	6**	10
Number of "restaurants" in 7 selected villages	21**	26
Number of "bars"/"drinking points" in 7 selected villages	23**	30
Number of "stalls"/"shops" in 7 selected villages	16**	58
Public transportation cost from Ngoyla to Lomié (US\$)	6**	7
Price of 1kg of rice (US\$)	1	1.1
Price of 400g soap ("Azur") (US\$)	0.8	0.9
Price of 1 liter of kerosene (US\$)	1.4	1.5
Price of 1 liter of refined palm oil (US\$)	2.8	3.1
Price of one beer ("33 export") (US\$)	1.8	2
Price of a Bowl (20l) of macabo (US\$)	3	5
Price of a Bowl (20l) of cassava (US\$)	3	7
Price of a bunch of plantain of medium size (US\$)	1**	2

Sources: *field work **Fogue 2012, Defo *et al.* 2015 (for data without *)

FIGURE 6 *Impacts of timber industry on some economic activities in Ngoyla*

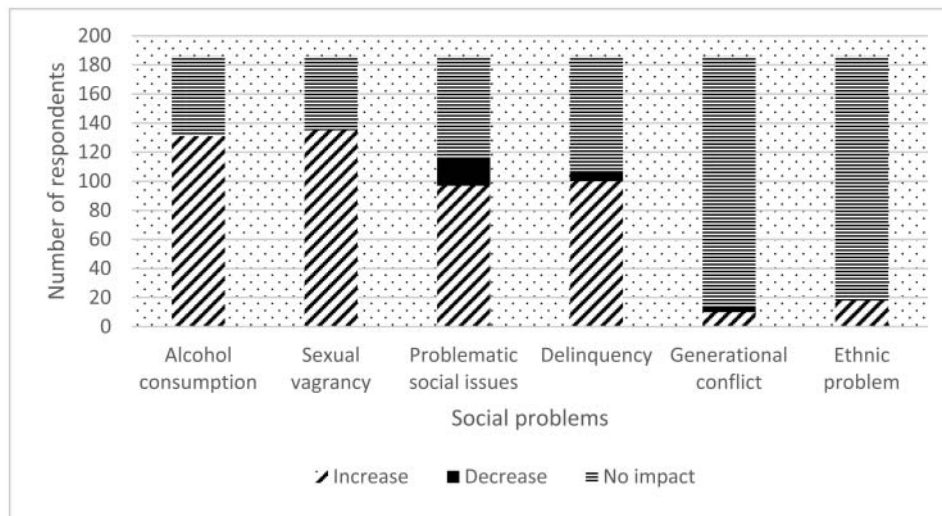
Source: Field Work, 2018

corroborated the Commissioner's thoughts. He said, "marriages between employees of logging companies and girls from the local communities are quickly formed and destroyed immediately when pregnancies and diseases are reported". The priest of the Ngoyla Catholic Church further expressed his concern relating to alcoholism by saying: "When the pay period for the wages of employees of logging companies arrives, everything stops. People get into alcohol. Alcohol consumption has become excessive".

Significant social problems have been created in Ngoyla since 2013 by the competition between some logging company

employees and members of the middle classes native to Ngoyla related to the rental of cocoa plantations from poor farmers. Before the advent of logging, members of local communities were the only ones to rent cocoa plantations but since 2013 this situation has changed due to the greater financial power of employees of logging companies. Faced with this situation, some locals are trying to agitate xenophobic attitudes towards logging company employees which has created a perceived air of social conflict in Ngoyla. This situation has been aggravated by an increase in extramarital sexual relations caused by the financial influence of some

FIGURE 7 Some social impacts of timber activities in Ngoyla



Source: Field work, 2018

logging company employees. The outcome of unwanted pregnancies, STDs and children unacknowledged by fathers, in addition to the issue of disruption to the market for cocoa farm leasing, has been most heavily felt by Bantu women and Baka Indigenous peoples in part due to their disadvantaged social situation.

The situation of Baka Indigenous people (semi-nomadic Indigenous communities, mainly hunters-gatherers) in general deserves special attention in relation to negative impacts. Indeed, with 18% of the population of Ngoyla, the Baka occupy only 6% of the jobs in logging companies and almost all the positions that are assigned to them are temporary. However, it is the Baka who suffer the most from the direct or indirect degradation of the forest area by logging since, more than the Bantu, they depend on the forest ecosystem for their food, habitat, pharmacopoeia and culture. For example, at present, Baka who depend more than 80% on wildlife for their animal protein needs suffer enormously from overexploitation of the fauna and the drastic reduction of the hunting yields following the increase in poaching generated by logging. On this subject, the head of the Baka community of Mabam expressed himself as follows: *“with the forest roads, foreigners enter deep into the heart of the forest with motorcycles and guns to kill game. When we get to where they went, we can’t find the animals and we have no meat to eat”*. Bakas are also involved in strong competition with *“foreigners”* for the collection of certain NTFPs because of the facilitation of access to the *“heart of the forest”* through roads created by logging and difficulties finding their bearings in the forest due to the multiplicity of logging trails opened by logging companies. An analysis of the management plans of FMUs concerned revealed that the damage suffered by Bakas due to the degradation of the forest is enormous in part because none of the logging companies has conducted participatory mapping with Baka communities to identify their resource areas (areas where they carry out their socio-economic and cultural activities at a particular moment of the year in forest) in FMUs and define with them protection,

conservation and/or compensation measures. This lack of consideration of the resource areas of communities is a flagrant violation of their traditional rights on their ancestral land. The non-respect of the resource areas of the communities constitutes a violation of the customary or use rights devoted to the populations by article 8 of Law No 94/01 of 20 January 1994. This situation justifies the growing loss of the interest of some Baka in the forest areas and the semi-permanent installation of the latter not far from the settlements of logging companies or some Djem hamlets. This semi-permanent relocation allows them to do housework and farm labor for the Bantu and company employees. Their payment is usually made of alcohol, cigarettes, old clothes or less than US\$ 1 for more than 5 hours of work. This cheap labor force is highly appreciated by immigrants who have rented cocoa farms in Ngoyla and by some local Djem elites who have undertaken to create plantain farms in order to try to capitalize on the increasing demand for food products in Ngoyla. In this respect, it is worth noting that industrial logging has accentuated the practice of quasi-enslavement of the Baka by the Bantu and the immigrants in Ngoyla. The fact that Baka had their cocoa plantation rented at low prices and turned themselves into workers in the same plantations is the most emblematic case of this situation of impoverishment of the local population due to the presence of industrial logging.

The amplification of the cocoa leasing phenomenon by employees of logging companies (the number of cases of cocoa leasing more than doubled between 2011 and 2015) is increasing the precariousness of livelihoods and the poverty of local and Indigenous populations. The rise in the prices of agricultural products in Ngoyla as shown in Tables 3 and 4 can also be a factor of the impoverishment of some people. The presence of logging companies with their employees who have a purchasing power much greater than that of the mostly peasant populations of Ngoyla has led to a local inflationary trend of prices of certain commodities on the local market and a consequent high cost of living. During group discussions, one of the resource persons expressed this situation as follows:

“The standard of living is higher and the poverty is growing [...] the pace of life has changed. Logging companies came and aggravated the situation”.

At the political and administrative levels, the biggest positive impact in Ngoyla is the functioning of the council. Indeed, until 2013, the Ngoyla council was one of the poorest in Cameroon with a budget hardly of around US\$ 100 000 a year. Since 2013, thanks to the AFR and the industrial exploitation of the council forest, this budget is generally above US\$ 1 000 000. This importance of forest royalties has been emphasized by the mayor as follow: *“the product of the AFR contributes more than 80% to the financing of the municipal budget and is a real lever for the development of our municipality as a territorial entity and even for the functioning of municipal services”* (Maire de Ngoyla 2015). As such, it is impossible to imagine the acceptable functioning of the Ngoyla council without the AFR, i.e. without industrial logging.

In terms of the negative effects, it should be noted that the arrival of the AFR in Ngoyla sparked a strong competition for the position of mayor in this municipality in 2013. Indeed, during the municipal elections of 2013, for the first time since the creation of this council in 1995, three lists were in competition within the ruling party, the Cameroon People Democratic Party (CPDM). The political battle was so severe that it took the highest national bodies of the CPDM to suspend some of its local cadres for indiscipline, in order to try to restore order after the elections. This political tension generated by the poor management of AFR and the outcomes from the Ngoyla council forest has seriously hampered the ability of the mayor to act on initiatives requiring the mobilization of the population.

At the cultural level, no significant impact has been attributed to logging according to interviews. At the level of sport, people are unanimous in saying that logging companies contribute to Ngoyla's sports activities, notably through the

layout of some playgrounds and the organization of football competitions. It should be noted that this impact on sport is seen almost everywhere in Cameroon at the level of logging localities. Logging companies seem to have understood that football, which is a passion almost everywhere in Cameroon, could help them distract the population from difficult issues and improve their image.

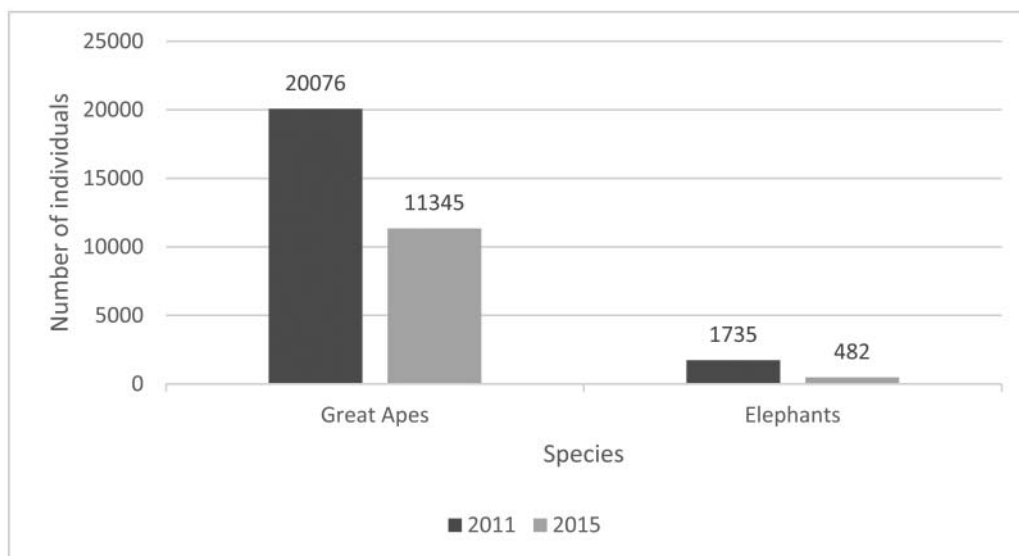
Natural resources

Three important natural resources in the livelihoods of the Ngoyla people were considered: wildlife, forests and land. It has previously been recorded that industrial logging, through improved accessibility and immigration, encourages poaching, overexploitation and reduction of wildlife populations in Central Africa (Auzel 2001, Defo *et al.* 2013, Mengho 2003, Mengue Medou, and Waaub 2005). Investigations conducted in Ngoyla show that the same causes have produced the same effects. For example, the local agent of MINFOF declared that *“poaching has become intensive with employees of forestry companies who have more financial means and use service cars to transport their booty”*. Indeed, as shown in Figures 8 and 9 between 2011 and 2015, populations of great apes, elephants and duikers have considerably decreased in the Ngoyla-Mintom forest block.

Elephants are a potential source of income for local and Indigenous communities through potential ecotourism activities while duikers constitute one of the main sources of animal proteins for the Ngoyla populations. Overexploitation of fish was also reported, following the immigration into Ngoyla of members of certain communities with extensive experience in fishing. Overexploitation of wildlife results in reduced availability and a consequent increase in Ngoyla bush meat prices as illustrated in Figure 10 and Table 4.

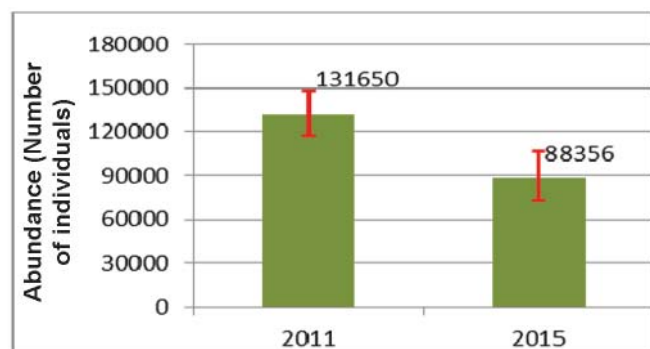
The prices of wildlife products have increased remarkably in Ngoyla between 2011 and 2016 compared to the trend

FIGURE 8 Population trends of great apes (gorillas and chimpanzees) and elephant in the Ngoyla-Mintom forest block (2011–2015)



Source: Ngoran Kouame 2017: 39

FIGURE 9 Evolution of absolute abundance of duiker populations in the Ngoyla-Mintom forest block (2011–2015)



Source: Defo 2017: 37

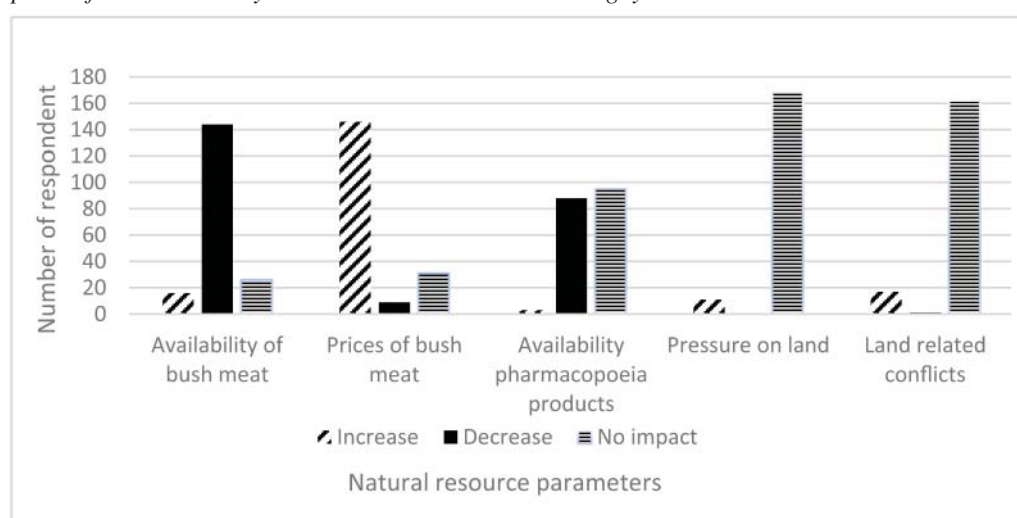
recorded in Mintom. For example, the price of an average sized porcupine roughly doubled in both Ngoyla and Mintom. The price of a food dish with bushmeat²⁵ went from 0.6 to 1 US\$ in Ngoyla while in Mintom, it was stable at 1 US\$ (Fogue 2012: 36, Defo *et al.* 2017: 31–32).

Logging has had both negative and positive impacts on the availability of NTFPs in Central Africa. But, overall or at

a general level, the impacts of logging on NTFPs are considered to be negative (FAO-COMIFAC 2007). People in Ngoyla also believe that logging has both positive effects and negative impacts on NTFPs, but these people point out that the harms are generally greater than the positive impacts. Group discussions in Ngoyla indicated that there is a decrease in availability of some NTFPs and a consequent increase in the prices of products such as of moabi (*Baillonella toxisperma*) oil and the larvae grown from sapelli (*Entandrophragma cylindricum*).

Industrial logging has had a highly significant impact on the exploitation of community forests in Ngoyla. Between 2004 and 2008, nine community forests were created in Ngoyla, but remained largely unexploited due to geographical inaccessibility. However, after 2013, improved accessibility by logging companies allowed small-scale loggers to log and sell timber from community forests easily. In this framework, one of the industrial logging companies operating in Ngoyla has partnered with three Ngoyla community forest entities through a small-scale timber operator, to harvest timber in their community forests. This exploitation enabled these communities to sell their wood at more lucrative prices (between US\$ 50 and US\$ 60 / m³) compared to prices in other remote and inaccessible areas (usually less than US \$ 40 / m³). The

FIGURE 10 Impacts of timber industry on some natural resources in Ngoyla



Source: Field work, 2018

TABLE 4 Evolution of prices of bush meat in Ngoyla between 2011 and 2018

	2011	2018*
Price of an average size cane rat (whole and fresh animal) (US\$)	3**	5
Price of an average size duiker (whole and fresh animal) (US\$)	12	14
Price of an average size porcupine (whole and fresh animal) (US\$)	3	6
Price of an average size monkey (whole and fresh animal) (US\$)	4**	5
Price of price of a food dish with bush meat in restaurants (US\$)	0.6**	1
Price of one kg of ivory (US\$)	160	600*

Sources: *field work (2018 data), **Fogue 2012, Defo *et al.* 2015 (for data without *)

²⁵ In both localities, the quantity of food was reduced between 2011 and 2016.

sale of wood in the framework of this partnership helped Djadom and Malechene communities in Ngoyla to significantly improve the quality of their houses and to promote the education of their children (twenty houses with corrugated roofing sheets constructed, building a house for two teachers and paying the salary of a temporary teacher²⁶ in 2016)²⁷.

With regards to land, there is no real problem as shown in Figure 10. Demand for land for agricultural activities has not increased significantly, resulting in little increase in land conflicts. Therefore, there is no significant pressure on land. This situation is justified by the low population density (1.1 person / km² in 2015), the availability of vast areas not yet cultivated or developed, the fact that people cultivate everywhere without taking into account land use zoning²⁸ and the absence of large-scale land consuming investments such as agro-industries in Ngoyla.

DISCUSSION

Outcomes of logging for local populations: a mixed result despite the new context

The hypothesis which underpinned this work was that the novel environment resulting from the conjunction of the factors presented in the introduction (improvement of the normative framework; enabling conditions for law enforcement; strong and influential presence of numerous support structures and other elements) could generate clearly significant positive impacts of logging on the populations of Ngoyla. The results show that this was not the case. Logging in Ngoyla is far from having significant more positive impacts compared to what has been noted elsewhere in Central Africa in general and in Cameroon in particular. The favorable factors noted therefore were unsuccessful at creating an environment capable of generating a strong and marked tendency towards local development or at least positive dynamics in contrast with what has so far been observed at other operating site of logging companies.

Furthermore, in Ngoyla, according to 55% of the surveyed population the impact of logging is perceived to be generally negative, compared with approximately one-third of the population, who think that this impact is positive, while the remainder considers the impact to be neutral. A village chief stated: *"If logging was like this everywhere, it is not worth it. Logging is not useful in Ngoyla. We only have the tradition to react; we are waiting for them in the forest"* (the chief thinks they must oppose logging mystically). The Divisional Officer

(DO) of Ngoyla decried the absence of positive outcomes from logging in the following way: *"There is no noteworthy impact of industrial logging here. The roads are not maintained. After the "tenue de palabre"²⁹ logging companies give a little food to the people, but nothing follows, what they said remains like "Paroles politiques"³⁰* (the local Administrative Authority is saying that when the logging companies arrived in Ngoyla, they gave food to the population and promised them other achievements, but after their implantation, they have not kept their promises and that is why there is almost no significant positive impact). Despite these criticisms, only 29% of people suggested that timber exploitation should be stopped and 47.3% think that exploitation can continue under certain conditions. These data confirm the ambivalent attitudes of local populations vis-à-vis industrial concession as observed by Joiris and Bigombe-Logo (2010)³¹. Populations are divided between, on the one hand, the advantages that logging provides, such as improving accessibility and jobs, and, on the other hand, the disadvantages linked to this activity (reduction in the availability of certain forest resources for example) as well as the disappointments in relation to their expectations in terms of support for education, health and rural water supply.

The negative impacts of logging are more numerous and affect vital areas such as education, health, social cohesion, governance, and the rights of vulnerable social components. These are sensitive issues without which any structural and sustainable improvement of the living conditions of a population is not possible. The overall results corroborate observations made in various works carried out in other tropical areas of Africa (Hakizumwami and Milol 2000, Mengho 2003, Bigombe Logo and Atamana 2004, Mengue Medou and Waaub 2005, Counsell *et al.* 2007, Topa *et al.* 2009, Lescuyer *et al.* 2012, Alemagi and Nukpezah 2012).

Gaps remain between adoption and effective implementation of policies and regulations

Part of the perceived failure of industrial logging to meet the expectations of the local populations can be explained by the gaps between anticipated impacts (expected impacts from AFR, expected impacts from specific obligations prescribed to logging companies operating in Ngoyla, expected impacts related to legality enforcement as prescribed by VPA-FLEGT) and what has been delivered. That situation is due to discrepancies in the texts (policies, regulations . . .) on the one hand and what is actually applied in the field on the other. For example, after almost a decade since the signing of VPA,

²⁶ Teacher recruited and paid locally by the parents of pupils to remedy the shortage of teachers recruited and paid by the government.

²⁷ Defo 2017: 19.

²⁸ Land use zoning distinguishes the permanent forest estate (where agricultural activities are prohibited) and the agroforestry zone (where agriculture is allowed).

²⁹ The *"tenue de palabre"* is a meeting organized by Senior Divisional Officer (SDO) at the beginning of logging activities to introduce the logging company at the in the neighboring villages of the logging site.

³⁰ In Cameroon, *"Paroles politiques"* in popular jargon are promises that are not necessarily respected by the people who make them.

³¹ Joiris and Bigombe-Logo (2010) quoted by Karsenty (2016: 33).

progress in implementation has been slow. The first certificates of legality were issued by MINFOF eight years after VPA signature, and eight years after the initial deadlines (2012) for producing FLEGT legality licenses there is no immediate likelihood of them being completed. In addition, forest policy and governance reform prescribed by VPA-FLEGT has made no significant progress.

Evidence of the lack of logging companies to adhere to formal regulations comes from field observations where, in spite of the requirements of the VPA legality grid, acts of illegality continue. For example, logging companies operating in the area have not carried out environmental and social impact assessments before starting forest exploitation in violation of the framework law on the environment, the practices of obstructing watercourses are recurrent in their concessions in violation of intervention standards in the forest environment, none of these companies has published its specific obligations, which constitutes a violation of the requirements of the operating agreement, and communities were not involved in the development of FMUs' management plans, which is a violation of Order No. 222 establishing the procedures for the preparation and approval of management plans. As such, it would be unrealistic to expect positive direct or indirect effects of VPA on communities adjoining logging (Beeko and Arts 2010, Wiersum and van Oijen 2010, Ramcilovic-suominen *et al.* 2010, Wiersum *et al.* 2013, FERN 2016, Cerutti *et al.* 2020).

Regarding the AFR, the 2012 Joint Decree was amended by the 2015 finance law which cancelled the share of the AFR allocated to communities (2015–2017) and devoted almost all management powers to mayors. Taking into consideration the quasi-monopolistic system in Cameroon till now, mayors are not really accountable to the people. Taking advantage of this situation and the political rivalries that surrounded his election in 2013, the mayor of Ngoyla side-lined all the participative management entities of the AFR provided for by the joint decree of 2012 (Communal Management Committee and local management committee) and ignored the communal and local development plans while using the AFR. For example, one chief of village in Ngoyla said: *"We do not see what the AFR is for, yet the companies declare having paid. We do not know where that money goes. However, I am a member of the communal management committee of AFR. We sit when the mayor wants. In 2018, we sat only once. The mayor rejects the projects requested by the communities. Indeed, others have sought homes, a health centre but nothing is yet in place"*. In addition, despite the provisions of the above-mentioned Joint Decree, effective monitoring, evaluation and control of the management of the AFR are rare. The combination of these above-mentioned factor resulted in poor management of the AFR and limited impacts on population's livelihoods. It can therefore be noted that despite the change in the normative framework (advent of the joint decrees of 2010 and 2012), huge gaps remain between what the regulations say and what is actually applied in the field. Results of AFR management in Ngoyla is not different from those presented in other studies (Bigombé Logo 2003, Topa *et al.* 2009, Eloundou 2010, Cerutti *et al.* 2010, Lescuyer *et al.* 2012, Cerutti *et al.* 2016).

Gaps were also noted in the implementation of specific obligations of logging companies operating in the area. For example, one of the logging companies installed its operating headquarters outside the area indicated in the legal obligation thereby facilitating illegal hunting, companies were indifferent to the fight against poaching for which they are partly responsible, and some of them did not participate in the platform intended to promote good environmental and social practices in the Ngoyla-Mintom forest block. This non-compliance with regulatory obligations has been facilitated by the scarcity of monitoring and control missions designed to oversee logging companies' obligations (between 2012 and 2017 only two missions were carried out by the competent services) and also by the corruption and collusion that prevail in the forest sector in Cameroon (Carodenuto and Ramcilovic-Suominen 2014, Cerutti *et al.* 2016). The networks and practices that underlie illegality seem indifferent to the presence of independent external observation. This indifference is all the more likely since external independent observation has so far mobilized only a few CSOs whose deployment on the national territory is moreover greatly limited by the lack of means.

Finally, the last aspect on which an enormous gap between regulatory decisions and implementation on the ground was noted concerns the TOU which was supposed to promote sustainable management of the Ngoyla-Mintom forest block. Indeed, from 2013 to 2018, apart from the coordinator and a few eco-guards, none of its bodies was set up. The TOU has never been really functional due to lack of financial, human resource and administrative support as well as lack of political commitments. The observations noted in the previous paragraphs concerning the gap between regulations or the normative framework on the one hand and field practices on the other corroborate the observations made by other researchers (Alemagi and Nukpezah 2012, Cerutti *et al.* 2016) who worked on industrial logging in Cameroon.

Need for a real reform

The causes of the discrepancies noted are numerous and are for the most part structural, including corruption, lack of accountability, insufficient participation of stakeholders at the grassroots level, limited inclusive discussions, the socio-political system, and the absence of a real vision underpinned by effective commitments in the long term. These gaps raise questions about the context and the conditions for the adoption of laws, regulations, and other commitments by the government as well as the mechanisms for evaluation, monitoring and control of these different frameworks. It is clear that the government, through these frameworks, holds the essential levers to make industrial logging an important factor of local development. But it seems, with regard to these frameworks, that the government or at least the forest administration, is rather following a process that Ongolo and Badoux (2017: 129) called *"gouverner par la ruse"* (*"govern by cunning/trickery"*) which is *"the deployment of a range of strategies or tactics by an actor apparently weak to face or circumvent the domination of a powerful actor (or groups of*

actors)) and thus make one's own interests prevail". Indeed, a good part, if not all, of the above-mentioned measures (VPA-FLEGT, changes in the management framework of AFR, creation TOU, specific legal obligations) taken by the Government, have been under the pressure or the injunctions of donors, financial and technical partners or international NGOs and were more a strategy of "avoidance of blame"³² than a real desire for improvement. The reality today makes it possible to say that by opening the Ngoyla-Mintom forest block to industrial logging the objective of the forestry bureaucracy was more geared toward the search for sources of income for the public treasury and the creation of new opportunities of "clientelistic advantages"³³ for its benefit than concern to improve the living conditions of the Ngoyla communities.

This observation and the results obtained suggest, in accordance with other researchers interested in the constraints and challenges of the forest sector in Cameroon (Carodenuto and Ramcilovic-Suominen 2014, Cerutti *et al.* 2016), that satisfactory results in the sector can be obtained only if enforcement of laws and regulations is strengthened and a real reform in terms of vision, strategy, institutions, norms and culture related to the forest industry in Cameroon is carried out. Therefore, it is important, for example in the context of VPA-FLEGTs to insist on in-depth reforms of the forest sector.

Regarding a possible reform which would target the impacts of industrial logging on the living conditions of the populations living near logging sites and in connection with VPA-FLEGT, it will be important to have decision-making data collected over a longer period and during the fully operational phase of the APV-FLEGT. The data in this study essentially cover only a period of six years (2012–2018) which fall within what can be considered the early phase of the implementation of the VPA-FLEGT in Cameroon. The same observation can be made for the AFR management framework of 2012. This is highly relevant because only three years after its adoption, this framework suffered from inflation generated by the finance laws (2015, 2017) and which disrupted its implementation.

CONCLUSION

The opening of the Ngoyla subdivision forests to industrial logging in 2012 took place in a context marked by the conjunction of a certain number of factors likely to stimulate a significant improvement in the living conditions of local and Indigenous populations of this locality. These factors included the signing of the APV-FLEGT, the reform of the AFR management framework, the definition of special social and environmental obligations for logging companies in the area, the establishment of a TOU and the presence of a large number of support, observation or surveillance actors. Six years later, it is clear that the results of logging in terms of

positive socio-economic impacts at the local level are significantly below expectations. It was anticipated that logging would bring positive outcomes in the wellbeing (education, health, water supply and other socioeconomic needs) of the population. However, after six years, while it could be argued that financial capital has increased in the subdivision, notable negative impacts were experienced in the natural, human and social capitals. Examples such as a marked decline in the populations of some wildlife species, a reduction in the availability of certain NTFPs, a rise in social tensions, and a deterioration of the school and health services could be noted.

A significant reason for poor outcomes of industrial logging result from the gaps between the regulations and the commitments on the one hand and what is actually practiced on the ground on the other. This is the case, for example, with some requirements of the legality grid of the VPA, of Joint Decree N ° 0076 / MINATD / MINFI / MINFOF of June 26, 2012, and of the social and environmental obligations specific to logging companies operating in Ngoyla-Mintom. Although it is straightforward to conclude that the strengthening of the enforcement of laws and regulations is required, the elements underlying these almost systematic discrepancies (corruption, collusion, lack of accountability to local actors, lack of participation, etc.) highlight that without an in-depth reform of the forest sector and related fields it would be unrealistic to expect industrial logging to be a realistic lever for socio-economic development at logging sites. The VPA process should therefore put more emphasis on forest reforms and these reforms should be guided by good governance principles such as participation, transparency, accountability and rights. The reasons for the discrepancy between what should be happening and what is actually happening on the ground need to be identified.

In order to maximise the positive impact of industrial logging in terms of socio-economic impact at the local level, the local environment must be favourable. This requires strengthening the organizational capacities of local and Indigenous communities, developing internal cohesion and a sense of collective action on the part of these communities, engaging independent CSOs experienced in monitoring, ensuring that logging companies are committed to durability, identifying accountable local or community leaders capable of mobilizing endogenous forces, and ensuring the participation of key stakeholders and external partners in development initiatives.

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³² Weaver (1986) quoted by Ongolo and Badoux (2017: 140).

³³ Ongolo and Badoux (2017: 138) refers to Cerutti *et al.* 2013.

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'Our happy hour became a hungry hour': logging, subsistence and social relations in Solomon Islands

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HIGHLIGHTS

- Rural people's voices are rarely heard in forest policy and science.
- In Solomon Islands, logging rents remain with foreign companies and political elites, and hardly trickle down to rural communities.
- Local benefits of logging are minimal and ephemeral, whereas the environmental and social costs are significant and long-lasting.
- Addressing the negative impacts of logging on subsistence livelihoods and social relations needs to be prioritized in forestry policy.
- Particular attention is needed for the harmful impacts on women.

SUMMARY

Solomon Islands has relied on highly unsustainable industrial logging since the 1980s. While the development narrative around logging emphasizes its macro-economic importance, it structurally overlooks the impacts on local people's lives. Based on 200 qualitative interviews conducted in 25 villages and 14 logging operations in Malaita Province between 2016 and 2019, this paper demonstrates that the impacts of logging on subsistence and social relations are systemic rather than incidental. By making use of interview quotes, the paper gives voice to rural Solomon Islanders. The results show that the logging industry fails to generate lasting local benefits, while unsustainable logging practices undermine subsistence livelihoods, especially fisheries. Logging triggers conflict that long outlasts the operations themselves, causes sexual exploitation, facilitates excessive alcohol use and reinforces gender disparities by structurally excluding women from decision-making and benefit-sharing. This paper calls for a stronger focus on the social impacts of logging in forestry science, policy and practice.

Keywords: extractive industries, social impacts, Pacific, rural development, gender

«Notre aubaine est devenue l'heure de la faim»: coupe de bois, subsistance et relations sociales dans les Îles Salomon

T. MINTER et J. van der PLOEG

Les Îles Salomon sont devenues dépendantes d'une coupe de bois absolument non-durable depuis les années 80. Alors que la narration du développement portant sur la coupe de bois souligne son importance macro-économique; elle ignore structurellement les impacts de celle-ci sur la vie des populations locales. Ce papier se base sur 200 interviews qualitatives menées dans 25 villages et 14 opérations de coupe de bois dans la province du Malaita, entre 2016 et 2019, et démontre que les impacts de la coupe du bois sur la subsistance et les relations sociales sont systémiques, plutôt qu'accidentels. En faisant usage de citations provenant des interviews, le papier donne voix aux habitants ruraux des Îles Salomon. Les résultats montrent que l'industrie de coupe du bois échoue dans le domaine d'une création de bénéfices locaux durables, alors que les pratiques de coupe non-durables sapent les revenus de subsistance, particulièrement ceux de la pêche. La coupe enflamme un conflit qui perdure bien au-delà des opérations mêmes, causant une exploitation sexuelle, facilitant la consommation excessive d'alcool et renforçant la disparité entre les sexes, en excluant les femmes des prises de décision et du partage des bénéfices. Ce papier réclame qu'une concentration plus forte soit portée dans la science de foresterie, la politique et la pratique, sur les impacts sociaux de la coupe de bois.

'Nuestra hora feliz se convirtió en una hora del hambre': la tala de árboles, la subsistencia y las relaciones sociales en las Islas Salomón

T. MINTER y J. van der PLOEG

Las Islas Salomón han dependido de una tala industrial altamente insostenible desde la década de 1980. Mientras que la narrativa del desarrollo en torno a la tala de árboles enfatiza su importancia macroeconómica, estructuralmente pasa por alto los impactos en las vidas de la población local. Sobre la base de 200 entrevistas cualitativas realizadas en 25 aldeas y 14 operaciones de tala en la provincia de Malaita entre 2016 y 2019, este artículo demuestra que los impactos de la tala en la subsistencia y las relaciones sociales son sistémicos y no fortuitos.

Mediante el uso de citas textuales de entrevistas, el artículo da voz a los habitantes de las zonas rurales de las Islas Salomón. Los resultados muestran que la industria maderera no genera beneficios locales duraderos, mientras que las prácticas de tala no sostenibles socavan los medios de subsistencia, especialmente la pesca. La tala desencadena conflictos que duran mucho más que las propias operaciones, provoca la explotación sexual, permite el consumo excesivo de alcohol y consolida las disparidades de género al excluir estructuralmente a las mujeres de la toma de decisiones y del reparto de beneficios. Este artículo hace un llamado a que se preste más atención a las repercusiones sociales de la tala en la ciencia, la política y la práctica de la silvicultura.

INTRODUCTION

Tropical timber concessions are predominantly situated in forests that are inhabited or surrounded by forest-dependent people (Asanzi *et al.* 2014, Counsell *et al.* 2007, Lescuyer *et al.* 2012, Ndoye and Tieguhong 2004). The importance of forests for such populations in terms of food provisioning, cultural identity, health and income is well-established (Arnold *et al.* 2011, FAO 2017, Karjalainen *et al.* 2009, Wunder *et al.* 2014). Moreover, tropical timber tends to be harvested from areas characterized by remoteness, poverty, limited government presence and poor delivery of basic services and justice (Chomitz *et al.* 2007, Counsell *et al.* 2007, Headland and Headland 1997, Mousseau and Lau 2015, Persoon 2000, Watson 1996).

Given the combination of concession residents' high forest-dependency and high socio-economic vulnerability, it is essential to understand how local populations are affected by industrial logging operations. However, the social impacts of industrial logging remain under-researched and poorly addressed (Cerutti *et al.* 2014).

So-called 'South Sea wood' has become a major component of international tropical roundwood flows over the past decade. The International Tropical Timber Organization (ITTO) puts Papua New Guinea at the top of tropical log exporters, followed by neighbouring Solomon Islands (ITTO 2019). In both countries, roundwood is predominantly sourced from customary-owned, standing forests, which also form a major source of subsistence and cultural reproduction (Global Witness 2018, Mousseau and Lau 2015).

Especially in developing economies, the forestry sector's contributions to national and local income through export revenues, taxes and jobs is the foremost argument to legitimize a heavy reliance on the logging sector (Charnley 2005, Slee 2006). Often-cited calculations by the Food and Agriculture Organization of the United Nations (FAO) put the contribution of the formal forest sector at almost 1% of global GDP (\$600 billion), and the number of jobs it directly and indirectly creates at over 45 million (FAO 2014, FAO 2020, see also World Bank 2016). In an analysis of 2011 economic data for 58 countries that together account for the great majority of roundwood production, Li *et al.* (2019) arrive at similar employment figures and compute that the sector directly contributes over \$579 billion to these countries' national GDPs.

For four decades, successive Solomon Islands government administrations have used these macro-economic arguments to legitimize a heavy dependency on the logging sector (Allen

and Porter 2016, Bennett 2002, Frazer 1997, Hunt 2019). Well-documented concerns over widespread unsustainable and unregulated logging practices have been acknowledged (e.g. Dauvergne 1998, Global Witness 2018, Kabutaulaka 2000, LALSU 2015, Pauku 2009, Sinclair Knight Merz 2012: 25, SPREP 2019, Toki *et al.* 2017), but are simultaneously side-lined by the dominant narrative that it is logging that keeps the economy afloat (CBSI 2016, 2017, 2018, 2019, 2020, Pauku 2009, SIG 2016, IMF 2020).

However, figures on the sector's actual contribution to government revenue are inconsistent, ranging from as much as 50–60% (MOFR 2017: 16), to 18–20% (IMF 2020: 14, World Bank 2017: 71). Moreover, as a result of both institutionalized tax-exemption measures and tax evasion, under-pricing, under declaring, illegal operations and logging companies' erratic payment of fees, the sector's economic contribution falls far below what it could and should be (ADB 2012, Allen 2008, Bennett 2002, Farran 2016, Global Witness 2018, Laungi 2018 a, b, Porter and Allen 2015, World Bank 2017). Similar issues have been documented for neighbouring Papua New Guinea (Mousseau and Lau 2015, Scudder *et al.* 2019). Despite these problems, the discourse on the viability of the logging sector continues to focus on its macro-economic benefits and on the reforms necessary to maximize these (e.g. IMF 2020).

Meanwhile, there have long been serious and country-wide concerns regarding the local level social impacts of logging (e.g. Allen *et al.* 2013, Bennett 2002, Dyer 2016, Farran 2016, Frazer 1997, John 2017, Herbert 2007, Kabutaulaka 2000, Moore 2004, Raomae 2010, Roughan 1997), but these remain largely outside the scope of the policy debate on the future of logging in Solomon Islands. As will be specified and demonstrated below, social impacts are everything that affects or concerns people as the result of a planned intervention (such as logging operations) (Vanclay *et al.* 2015).

In a country where nearly 75% of the population live in rural areas (NSO 2020: 7), and are economically and socially reliant on forest and marine ecosystems, the everyday realities of people in logging concessions must be part of the policy debate on forestry. While the value of logging is usually approached from a macro-angle, this paper follows Asanzi *et al.* (2014) in taking a micro-perspective. That is, it asks: what does logging mean for rural Solomon Islanders' livelihoods and social relations? In answering that question, this paper specifically aims to give voice to local people's experiences, which are public knowledge¹, but remain largely neglected in forestry policy and science.

¹ Watch for example this 'Logging in Solomon Islands Rap' made by John Patteson Ngalihesi, a student of the University of the South Pacific in 2020: <https://www.youtube.com/watch?v=pM-ETSkdVxI>

LOGGING IN SOLOMON ISLANDS AND MALAITA

The Solomon Islands' logging sector revolves around the export of unprocessed round logs, 95% of which are destined for China (Global Witness 2018, Sinclair Knight Merz 2012, World Bank 2017), with the main export species being *Pometia* (Akwa), *Calophyllum*, and *Palaquim* (Pencil cedar). The sector is dominated by Malaysian logging companies (World Bank 2017), which operate on customary-owned land throughout the country. They can only do this through a licensee, a Solomon Islander who negotiates a logging agreement between the logging company and customary right holders (LALSU n.d.). Operations last between several months and a few years.

The Ministry of Forestry and Research (MOFR) and the Ministry of Environment Climate Change, Disaster Management and Meteorology (MECDM) are mandated to regulate the logging sector. The Forest Resources and Timber Utilization Act (FRTUA) (MOFR 1984), the Environment Act (SIG 1998), the Code of Logging Practice (SIG 2002) and the recently endorsed National Forest Policy (MOFR 2020) form the legal and policy basis for doing so. The FRTUA, which has long been known as 'a complex, unwieldy instrument' with 'potential for misinterpretation' (ADB 1998: 53), is currently under review. This is not the first attempt to come up with more effective legislation: both the 1999 Forest Act and the 2004 Forest Bill were drafted but never enacted (Allen 2008: 286–7) 'because the logging lobby perceived it to be against its interests' (Baines 2015: 2).

Logging happens virtually without oversight. License application requirements, including environmental impact assessments and consent procedures, are cut-short or foregone and environmental safeguards are neglected (Allen 2008, Allen and Porter 2016, Farran 2016: 189, Frazer 1997, Global Witness 2018). As a result, the forests of Solomon Islands have long been systematically overharvested (ITTO 2019, Katovai *et al.* 2015, 2021, MOFR 2020, World Bank 2017).

Malaita

Large-scale logging operations on the island and province of Malaita took off in 1982 (Frazer 1997). Logging especially intensified in the period leading up to and during the 'Tension', the civil conflict that lasted from 1998 to 2003, and resulted in the eviction of 35,000 migrant settlers (mostly Malaitans) from Guadalcanal, and the breakdown of business and infrastructure (Allen *et al.* 2013, Bennett 2002). Between 2015 and 2019, the number of logging companies operating on the island increased from 17 to 21 (Kirrau 2016, Saeni 2019). While their concessions are often located adjacent to each other, there is no mutual use of road infrastructure or log ponds (stockpiling sites for logs awaiting shipment).

Malaita is the second most-densely populated island and province, with a total population of 173,347 as of 2019. Up to

96% of these people live in rural areas, in villages spread out mostly along the coasts, and to a lesser extent in the mountainous forest interior. The remaining 4% live in the only urban centre and provincial capital, Auki, which houses the provincial government as well as a bank, a market and grocery stores (NSO 2020) (Figure 1).

Villages typically consist of a combination of houses entirely constructed from forest materials (sago and bamboo), and plank-walled houses with galvanized iron roofing. For drinking water, nearly half of Malaitans (48%) depend on unprotected, open sources, while another 41% rely on pipes leading down from an uphill water source in the forest to communal taps in the village². Sanitary facilities are largely absent, with 71.5% of Malaitans practicing open defecation (MHMS 2015). Outside the urban centre of Auki, people depend on solar panels and batteries for electric power, which not everyone can afford. Road infrastructure on the island is very limited (Hobbis 2019), and for transport between villages as well as to and from Auki, people depend on open public trucks, irregular ferry services and small boats.

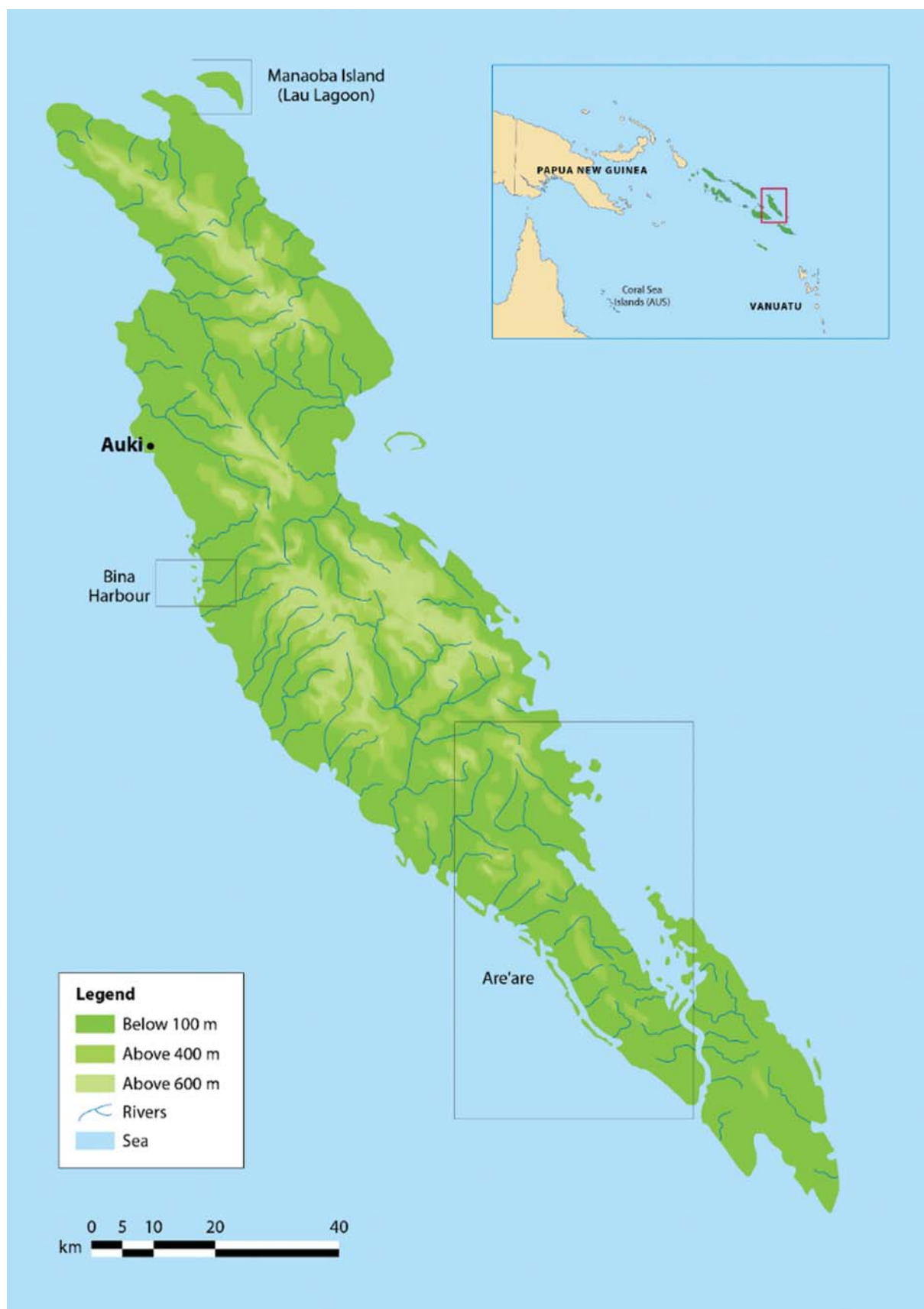
Forest and marine environments are vital for rural sustenance (Posso and Clarke 2014, Schwarz *et al.* 2013). Most people subsist on a combination of fishing and cultivation of root crops, vegetables and fruit trees in swidden fields. Garden crops are supplemented with both wild and semi-cultivated nuts, roots, leaves, fruits and fungi collected from the forest. Hunting of birds, bats, possums and rodents and the collection of frogs, lizards, insects, freshwater snails and molluscs is additionally important, especially for inland communities. The forest further provides the timber, bamboo and canes needed for housing (Moore 2017, Kwa'ioloa and Burt 2001, Ross 1973).

Local exchange of fish, garden and forest products is common, as is the sharing of food among closely related families. At the same time, 'subsistence affluence', the term previously used to describe the relative food abundance enjoyed by peoples inhabiting the islands of Papua New Guinea and Solomon Islands (Connell 1978, Ross 1973) no longer captures the contemporary context (Yari 2003).

Cash is increasingly important for purchasing goods in the provincial or national capital, for paying for food, transport, communication, education and consumer goods. However, opportunities for earning money in the rural areas are scarce, and while remittances from relatives working in urban centres or abroad are to some extent part of the rural cash flow (Posso and Clarke 2014), they do not provide structural support. It is in this context of 'poverty of opportunity', a situation where people are trapped in a narrow confine with little opportunity for change or development (Lightfoot and Ryan 2001), that logging may seem an attractive opportunity. Indeed, logging is surrounded by the promise of 'big money', mostly because of the royalties that are supposed to come with it.

² A further 8% of Malaitans obtain water from rain tanks, while 3% (mostly urbanites) receive water in private taps in the house, or use bottled water or water trucks (MHMS 2015).

FIGURE 1 *Malaita island, showing the provincial capital Auki and the research areas*



Collective landownership

Throughout Malaita, 12 distinct languages are spoken and people strongly identify with their cultural-linguistic group and the associated region, although many kinship links exist between them (Burt 1994, Moore 2017, SIL 2009). Individuals claim membership to patrilineal clans (commonly referred to as 'tribes'), each of which consists of the descendants of one single couple of ancestors, who are considered to be the clan area's original settlers. Not only is this area, which usually comprises both forest and coasts (including reefs), a main source of subsistence, it also contains sacred sites, which are central to ancestor worshipping practices that exist side-by-side with various forms of Christianity (Burt 1994).

The clan area is the collective property of all clan members, who refer to themselves as 'landowners'. The collective nature of land and resource ownership has important implications for logging, and in particular for decision-making processes and benefit sharing. However, who can legitimately claim to be a landowner in a certain area, and who, as a consequence thereof, is to be included in decision-making and logging royalty payments, is in many cases highly complex, context specific and deeply contested (Farran 2016).

METHODOLOGY

This study took an ethnographic approach, using qualitative interviews to document how logging operations change concession residents' lives in terms of cash income, basic

services, livelihoods and social relations. Just over 200 people (99 men and 102 women) from 25 villages were interviewed between November 2016 and December 2019. Together, these people provided information on 14 logging operations. By taking a qualitative approach in multiple sites, the data generate insights into the social impacts of logging that go beyond specific locations and individual experiences and allow us to determine if certain impacts are systemic, rather than incidental.

Most logging operations on Malaita take place in the region of Are'are (Figures 2 and 3), which is the main study area for this paper. In addition, data on logging operations that took place prior to and during the 'Tension' were collected on Manaoba Island in north Malaita, and around Bina Harbour (Figure 1). Research sites were purposively sampled (Morse *et al.* 2002) to represent both past and ongoing operations, as well as both coastal and inland sites.

While this paper is primarily based on empirical data generated inside logging operations, it has also been informed by qualitative interviews on logging and rural development with staff from government institutions (notably the Provincial Government of Malaita, MECDM, MOFR, the Ministry of Fisheries and Marine Resources and the Ministry of Women, Youth, Children and Family Affairs), and national and international civil society organizations, including WorldFish, Vois blo Mere (Women's Voice), the Mothers' Union, World Vision and Transparency International. Furthermore, research design, data collection and analysis were informed by review of the scientific and policy literature, as well as by national

FIGURE 2 Are'are region, showing larger villages and specific sites mentioned in the text



FIGURE 3 *People crossing a log pond in West Are'are (Minter 2017)*

and international media coverage on the research subject. This paper thus is the result of an iterative-inductive process, in which there is a constant moving back and forth between theory, analysis, data, interpretation and writing (O'Reilly 2012a).

Ethics and consent

Field work for this study was conducted under a research permit granted by the Solomon Islands Ministry of Education and Human Resources Development and with ethics approval from the European Research Council under the Horizon 2020 programme. The study was further designed and implemented in line with the European Code of Conduct for Research Integrity (ALLEA 2017) and the Principles of Professional Responsibility of the American Anthropological Association (AAA 2012).

In line with the above guidelines, as well as following additional principles for working with forest-dependent communities (Persoon and Minter 2011), in each research site consent was first sought from the relevant customary authorities, usually the village chief and clan leader. In some cases, they decided to call residents together, in order for the principal researcher to explain the aims and process of the study, and for people to ask further questions. During these gatherings Solomon Islands Pidgin, the national lingua

franca, was used, which was in some cases translated in the region's language by locally-hired assistants. In addition, information sheets explaining the study purpose in Solomon Islands Pidgin and providing the contact details of the principal researcher were disseminated.

Prior to each interview, the study aims and process were explained once more and permission to ask questions and note down answers was sought from individual interviewees. Immediately following the interview, the principal researcher double-checked whether the interviewee still agreed that the information provided was included in the study and the option to withdraw was explicitly given.

Data collection

Data were collected through qualitative interviews, combined with on-site observations in order to contextualize and triangulate the information generated. Interviews and observations took place in villages, on log ponds, in logging camps, at felling sites and during gardening and fishing activities. Depending on the situation and informants' preference, interviews were held individually or in small groups. In the analysis, information was always traced back to individual informants.

As is common in ethnographic research, the types of interviews used in this study range on a continuum from semi-structured to open, with many interviews containing

elements of both (Firmin 2012). Which type of interview was most appropriate depended on the aim and setting of the interview, and the expertise and interests of the interviewee.

For example, when talking about the general characteristics of logging operations (e.g. its history, duration, ownership and staffing) with village leaders or operation managers, a short list of predefined questions was used to collect basic information that was needed to compare operations across sites. Similarly, when speaking with interviewees about employment and income in logging operations, that part of the interview was semi-structured, including standardized questions about the period and type of employment, working hours and remuneration.

In contrast, (parts of) interviews that addressed more complex or sensitive subjects, such as royalty payments, conflict, or sexual exploitation, required a more open-ended and interviewee-led mode of interviewing (Firmin 2012). In such cases, questions asked were guided by topic lists, which evolved based on new insights that emerged as the research progressed. In these in-depth interviews, probing (asking follow-up questions) and free-listing (encouraging informants to provide examples of a certain phenomenon) were key interview techniques to generate both comprehensive and in-depth insights (Morgan and Guevara 2012).

This grounded, inductive approach ensured that interviews covered subjects that were locally relevant, rather than externally determined (Firmin 2012). It also meant that the exact focus of each interview depended on the emphasis that informants put on specific topics, which differed in accordance with someone's specific expertise, experiences and social position. Therefore, the number of interviewees per specific topic varies and is specified in the results.

Sampling and biases

Informants to this study were invited to participate based on the criteria that the sample should reflect: a) gender representativeness; and b) the widest possible range of views and experiences regarding the social impacts of logging (i.e., those of both supporters and critics of logging). The second criterion was emphasized while introducing the study to customary authorities and individual informants. It was also adhered to as much as possible by seeking additional informants until data saturation was achieved, i.e. the moment that no new insights or perspectives on specific topics emerged from interviews in each site (Morse *et al.* 2002). One bias in this respect is that the licensees, who can be expected to point out the positive impacts of logging, were often not present in the concessions and attempts to contact them in other locations were in a few cases turned down. The same applies to several foreign company managers, who refused to be interviewed. Another bias in the sample is the overrepresentation of adults, most of whom had families. The views

and experiences of adolescents and children are worthy of a separate study.

Analysis and presentation of data

Interviews were transcribed into English and manually coded by labelling them according to themes (e.g. 'cash income from logging', 'impacts on social relations', or 'impacts on fisheries') and sub-themes (e.g. 'royalties', 'unwanted pregnancies', or 'sedimentation of mangroves'). Specific sections of interview transcripts on the same sub-theme were then regrouped in one file, while keeping the link to individual respondents and research sites intact. For each of these sub-themes, the interview data were then analysed in detail by determining how and by whom it was expressed, and how often and where this theme emerged.

Through this iterative process of close-reading, moving and re-aligning of the data itself, as well as through review of the literature, policy and reflection on above mentioned discussions with professionals, the results were re-grouped into overall themes. Thus, the four domains of impacts of logging that form the structure of the results section (cash income, subsistence, basic services and social relations), are the outcome of this continuous moving back and forth between data, literature and policy (O'Reilly 2012b).

As previously stated, it is a specific aim of this paper to give voice to residents of logging operations. In the presentation of the results, the key themes arising from the data are therefore illustrated with quotes, which are referenced with a respondent number. In the results, the frequency with which certain topics were raised in interviews is given (see Table 1). Given the above-described data collection process, these frequencies cannot be converted to percentages as this would falsely suggest that a particular topic is deemed important by a certain percentage of the population, and by implication unimportant by the rest. Table 1 demonstrates the number of interviews in which a topic was raised, as well as the absolute and relative share of the villages and logging operations where the issue was found.

Figures 7 and 8 were produced by MapHubs following a request by the authors. Log pond data (Figure 7) were collected through OpenStreetMap, complemented with ESA Copernicus Sentinel-2 satellite imagery. This was checked and complemented with prior knowledge on log pond locations provided by the authors, which was verified using Google Earth's imagery archive. Logging roads (Figure 8) were mapped based on an update of earlier analysis³.

RESULTS: THE SOCIAL IMPACTS OF LOGGING IN MALAITA

Social impacts include all issues associated with a planned intervention (i.e. a logging operation) that affect or concern

³ See: <https://medium.com/maphubs/seven-maps-that-explain-logging-in-the-solomon-islands-7dba7368e69e> and https://www.globalwitness.org/documents/19471/Logging_Roads_in_the_Solomon_Islands.pdf.

people, whether directly or indirectly, positively or negatively. They may be experienced either in a cognitive or a physical sense, and at any level: individual, household, larger social group, workplace, community or society. This includes impacts on the environment, livelihoods, health, cultural heritage, well-being, and people's fears and aspirations. In short, anything can potentially be a social impact of a planned intervention, so long as it is valued by or important to a specific group of people (VanClay 2003, VanClay *et al.* 2015). In the following, the four domains of perceived social impacts identified in the ethnographic data on past and ongoing logging operations on Malaita will be discussed. These are impacts on: 1) cash income, 2) subsistence, 3) basic services, and 4) social relations.

Cash income

With cash earning opportunities in rural Malaita being limited, the most-anticipated impact of logging is its promise to generate local cash income. This cash has the potential to come in three main ways: from royalty payments, through jobs and by fuelling other local businesses.

Royalties and other fees

Although this is not legally underpinned, both residents of logging operations and government officials consistently say that royalty shares amount to 15% of the export value of each shipment of logs⁴. 5–10% is the licensee's share, and the remainder goes to the landowners, i.e., those who claim clan membership to the area where the trees were felled. In addition, the licensee and company negotiate various fees for land leased for log-pond and road construction, and for anchoring rights in communal waters. The computations of these fees in most cases lack transparency and are rarely formalized. Moreover, the average landowner has little influence on the negotiations, as is clear from this reflection by a man from Mararo, East Are'are (Figure 2), where an operation started despite local opposition:

'Now that the company is here, we should make the best of it. The machines landed on Friday [March 10 2017]. On Saturday [the licensee and land committee chair] came [here] and we told them: "You'd better make sure that you negotiate well with the company, because if not, everything fails for us." (R5)

The company pays the royalties and fees to the licensee, who then pays the landowners' share to the 'land committee'. This committee (composed of 5–7 people, always men) represents the people who collectively own the forest and coastal areas in which the logging activities take place and is responsible for further distribution of the money to these people. There are two options here.

One option is that the money is invested in communal projects, usually housing. However, although plans for such projects were mentioned in all fourteen logging operations, only two potentially successful examples, in two different logging operations, were observed. Both of these concerned housing projects and both were still ongoing at the time of research. In the other twelve logging operations, the planned projects never materialized and were surrounded by allegations of mismanagement of logging funds. However, criticism of such mismanagement is limited and can easily backfire on the complainants. One committee member, for example, reported how the licensee removed him from a communal housing project after he complained about lack of progress and mismanagement.

Alternatively, the money is paid on a per capita basis to all clan members, but in practice this is equally unsatisfactory. While a small number of informants report to have received one-off amounts ranging from SBD 50 to 500 (USD 6 to 62), most say they have never received such payments as a result of maldistribution and misallocation of royalties. This issue was raised in 51 interviews, and was pertinent to 64% of the villages and 86% of the logging operations (Table 1). Crucially, both women and men consistently say that women typically do not receive payments.

More generally, royalties and other fees are commonly said to be used for short-term pleasures by a select few, rather than bringing lasting benefits to the larger collective of landowners. Accounts of big spending are common in all logging operations visited and are throughout Solomon Islands referred to as *kaikai selen*, literally 'eating money' (see also Dyer 2016). A woman from West Are'are commented:

'When the machines work, corruption comes in. Only the committee members benefit from the logging. When our committee chairman received the money, he opened an account for us landowners in Honiara [the national capital], but when he came back all the money was finished to the last coin: it went to motels, drinking and women.' (R118)

Jobs

Logging companies in Malaita operate on three sources of labour: 1) a foreign workforce of management personnel, technical staff and machine operators from Malaysia, the Philippines and Indonesia; 2) a national crew of chainsaw operators, trimmers and scalers, commonly referred to as 'Solomon Boys'; and 3) local unskilled labour (Figure 4). Based on interviews with operation managers and personnel officers, the number of employees per category were listed for eight recently ended or ongoing logging operations in West and East Are'are. On average, each operation employs 16 foreign, 24 national and 36 local labourers.

⁴ Logging companies retain 60% of the log export value, while 25% consists of export duties. Export value is based on FOB (Free on Board) as set in the 'Customs and excise export duty rates for round logs' by the Ministry of Finance and Treasury.

TABLE 1 Overview of key issues in logging operations on Malaita (2016–2019), showing the number of interviews in which the issue was raised, and the absolute and relative share of villages and logging operations where issues were recorded (*F* = frequency)

Key issues raised in logging operations on Malaita grouped by overall theme	# Interviews in which issue was raised			Villages where the issue was raised (n=25)		Logging operations where the issue was raised (n=14)	
	Men	Women	Total	F	%	F	%
Cash income							
Maldistribution and misallocation of royalties	30	21	51	16	64	12	86
Subsistence							
Negative impacts on fisheries	39	39	78	16	64	7	50
Negative impacts on gardens	14	12	26	14	56	9	64
Negative impacts on drinking water	13	7	20	12	48	8	57
Social relations							
Conflict between logging company and landowners	19	8	27	11	44	9	64
Conflict between and within landowning clans	24	13	37	15	60	8	57
Sexual exploitation	25	24	49	13	52	10	71
Excessive alcohol use	12	25	37	14	56	9	64

FIGURE 4 Local crew and Indonesian machine operator in West Are'are (Minter 2019)



Information on local logging employment was collected from 67 people in 45 different households. For each of these households, information on employment in logging was listed by asking if the respondent or any other member of the household was currently or had ever been employed in logging operations. Of these people, 63% were hired for unskilled and low-paid jobs: security guards of machinery in felling sites, and on log ponds or surveyors for road construction and tree felling. A small number of women were hired as cleaners and cooks for the foreign workforce. Only 19% had jobs that required skilled labour, mostly chainsaw operation, or were involved in operation management (18%), which is usually rewarded with a certain amount per timber volume rather than with a regular wage.

Local employment is short-term, ranging from three months to three years, but typically lasting less than a year. Most male employees work 8 hours a day, six days a week, with overtime fees for night- and weekend shifts. Female employees report working up to 13 hours a day, six to seven days a week. Workers indicate that a job in logging leaves them with very little time for subsistence activities, such as fishing and gardening. Most workers are hired on a casual basis and do not receive health or pension benefits. Wages for unskilled labour roughly follow minimum wages. Delays in payment are common and reported to regularly lead to strikes. This was observed twice during the research, in two different operations. Meals are generally not provided for local workers, which results in considerable wage deductions as expensive company stores offer food, mostly instant noodles, canned tuna and rice, on credit.

Local business

Logging operations increase local business to some extent. Log ponds and logging camps function as weekly or fortnightly markets, where women earn between SBD 20 to 300 (USD 2.5 to 37) by selling garden products, fish, shells and cake (Figure 5). Local shopkeepers near logging roads and camps see their sales increase, especially around 'pay-day', but also face competition from logging company shops. Shopkeepers use the logging barges, which make occasional trips to Honiara, to supply their shops. However, as a personnel officer in West Are'are noted, the resulting increase in economic activity is temporary:

'When the logging barge arrives then it is all "Rice! Rice! Rice!". That time, some canteens run well, but [...] the supplies run out quickly. So it is on and off.' (R119)

In parallel to logging operations, some landowners set-up small-scale sawmilling enterprises, harvesting several timber species that are banned for export. This timber is mostly used for house construction, but some of it is sold in Honiara. These local enterprises also generate income for local chainsaw and sawmill operators, who earn SBD 100 to 150

FIGURE 5 Log pond market in East Are'are (Minter 2017)



(roughly USD 12 to 19) per day. Some of these businesses are operated by women, who proudly call themselves 'cubic women' (Saeni 2017a), after the volume unit used to measure timber.

Because these local enterprises are dependent on industrial logging operations for timber transportation, they dwindle as soon as companies retreat. Also, although landowners expect company personnel to offer their machinery and labour to haul and transport their logs and planks, company staff are not always helpful and often demand payments in return. A common complaint by 'cubic women' is that machine operators request sexual favours in return for assistance in log transportation.

Subsistence

The subsistence economy rests on two major activities: fishing and the cultivation of swidden fields planted with root crops, vegetables and fruit trees. In addition, some families have sago palm and coconut plantations, keep pigs⁵ or engage in hunting. Daily meals are based predominantly on the products of these subsistence activities, and to a much lesser extent on store-purchased ingredients. The forest and marine ecosystems thus form the basis of rural Malaitans' subsistence. As will be demonstrated below, residents of logging operations observe severe negative impacts on this subsistence basis.

Fishing

Fresh fish provide the majority of animal protein in Malaitan diets. Fisheries are predominantly small-scale, non-motorized and multi-species, with manual shell- and crab-collection, spearfishing and line fishing from dug-out canoes being the main techniques. Fishing grounds consist of mangrove forests, reefs, passages, rivers and creeks (Schwarz *et al.* 2013, van der Ploeg *et al.* 2016).

A variety of negative impacts of logging operations on fisheries were raised in 78 interviews (by 39 women and

⁵ Pigs are primarily bred for use in ceremonial activities and compensation payments.

39 men), which were pertinent to 64% of the villages and 50% of the logging operations (Table 1). Informants attributed these impacts to oil pollution, as well as to sedimentation and removal of reefs and mangroves.

Interviewees reported that oil regularly leaks from logging machines, logging barges and fuelling stations, which are positioned at the shore, and that it gets dumped in open water when the logging machinery receives its routine oil change (see also van der Ploeg 2020).

The effect of sedimentation of reefs is another concern for many interviewees. People describe this problem as a layer of soil covering the corals and they attribute this to sediment washing down from felling sites and logging roads⁶:

'Fishing inside the bay is a problem now because the mud is covering the corals and some corals die. But the people who like logging, they don't like to listen to us women. They say they don't worry about these things. They like logging, they like development. But what kind of development is this when it damages everything?' (R131 Woman from West Are'are).

The problem of sedimentation also affects mangroves, which form women's foremost shellfish and crab collection grounds. Given this gendered space, this problem was unsurprisingly more often mentioned by women, than by men (Minter *et al.* 2018). For instance, the gathering of the so-called 'disco-shell' (*Pegophysema philippiana*), which owes its name to women collecting it by wiggling their feet down in the mangrove mud, is said to have become impossible in at least three logging operations in both West and East Are'are because the mudflats have been covered by an impenetrable layer of gravel, soil and oil, washing down from logging roads, which suffocates and kills the shells.

An additional problem is damage to coral reefs as a consequence of anchoring logging barges and log loading, as well as the digging up of corals for log pond and logging road construction. Finally, mangrove forests are regularly cleared to convert them into log ponds (Figure 6). This happens despite the prescription that a 50m buffer zone from the coast is compulsory for log pond construction under the Code of Logging Practice (SIG 2002). Figure 7 shows the high density of log ponds on Malaita, especially in Are'are, where almost all log ponds are created by removing mangroves.

FIGURE 6 Clearing mangroves for log pond construction in East Are'are (van der Ploeg 2017)



⁶ River banks erode as the prescribed buffer zones (25 m for streams and 50 m for rivers (SIG 2002: 3)) are often disrespected and river beds are damaged by logging machinery as bridges are not consistently and properly constructed.

The effects of mangrove clearing are far reaching, as is clear from this reflection by a mother of eleven children, on how logging company Mega constructed a log pond in the mangroves adjacent to the village of Mararo (East Are'are):

'It is a big concern for me that the mangroves are gone because it is the place where I found food. When my children were small, I would go there to find food for all of them: it was close by, so when I heard them cry, I could just go back quickly. [The mangroves] also gave the last food to my husband when he was dying. When he was crying for roropio [mangrove worm], I just went there to collect it for him. It was the last thing he ate before he died. So when I saw the machines landing, I felt as if I saw my mother dying. I cried. The happiness, the food and the help that the place gave me, is now gone.' (R114)

Swidden cultivation

The other core component of rural livelihoods, swidden cultivation, is affected by logging in various ways. During the operation itself, in some logging operations women benefit

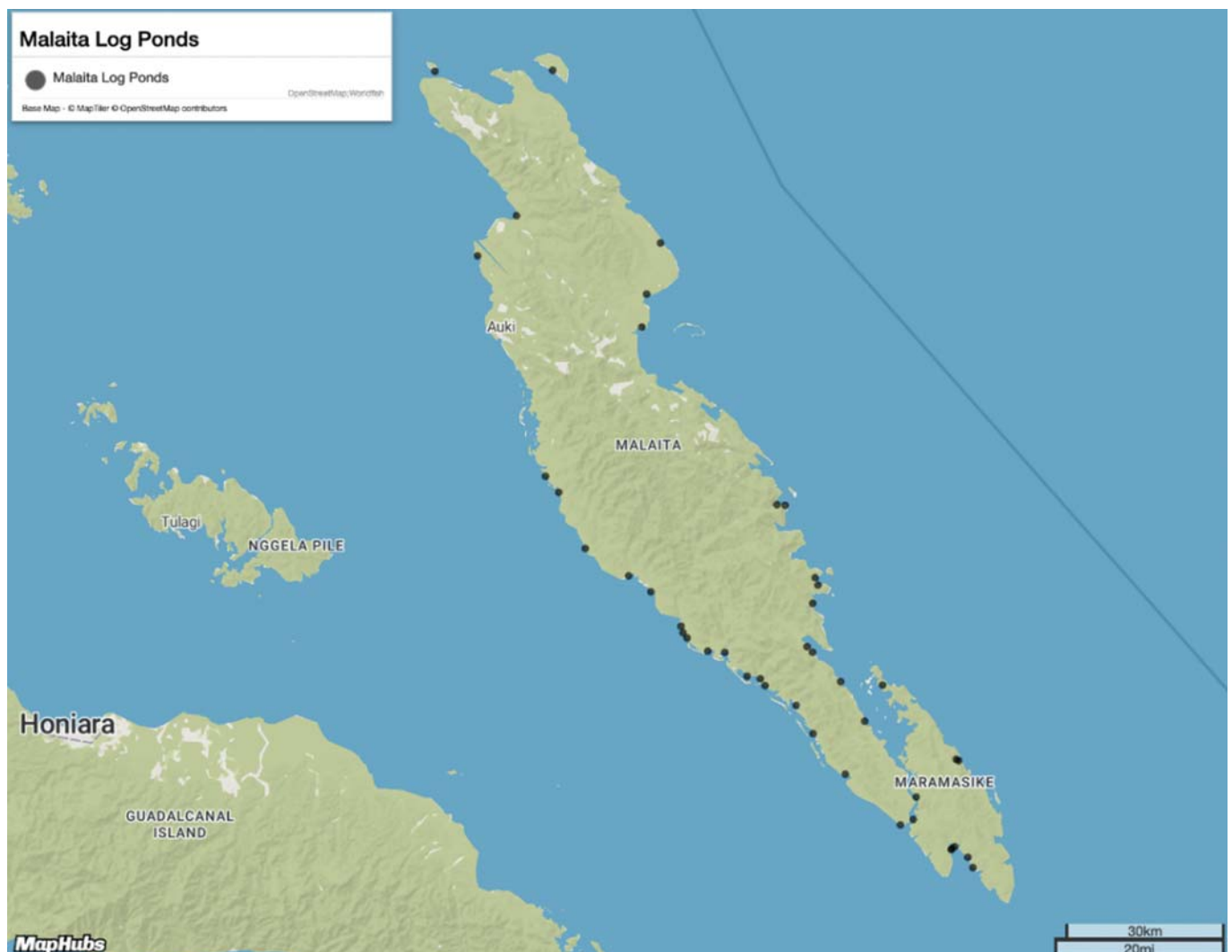
from hitchhiking on logging trucks for their daily work in the gardens, which saves them a lot of time and energy.

At the same time, the construction of roads, as well as the timber felling process itself causes damage to root crop gardens, pig pens, and to copra, betel nut and sago plantations. This issue was raised in 26 interviews (by 14 men and 12 women) and pertained to 56% of the villages and 64% of the logging operations (Table 1). People frequently request damage compensation, but mostly without result, as was explained by an elderly woman from East Are'are:

'Logging came, but to me it is a big problem. The [logging] road goes right through some of my gardens. I told the chairman [of the land committee] about it and the company said that they will pay [for the damage], but they did not say how much and when. I will have to open up new gardens because even though we can now buy some store foods, I am still not sure that we can eat in the future.' (R86)

In addition, several respondents reported seeing snails and a growth of weeds that they had not seen prior to logging, and

FIGURE 7 Distribution of log ponds on Malaita in 2019



which reduce the productivity of their fields. On Manaoba Island as well as around Bina Harbour, fifteen years after logging has ended, gardens are said to continuously suffer from these pests. As is known from other parts of the country, the transportation of logging machinery facilitates the spread of invasive species, including the Giant African Snail (*Achatina fulica*) (Kiddle *et al.* 2017, Saeni 2017b, Stronge 2016).

Food and water

Logging also has considerable impacts on food and water provisioning. In 20 of the 78 interviews in which negative impacts of logging on fisheries were raised, interviewees spontaneously indicated that these impacts meant that their families eat fresh fish and shellfish less often as compared to before. In the two sites where logging ended twenty years ago, Manaoba Island and the inland areas around Bina Harbour, the effects on fish consumption were said to be permanent. This woman from East Are'are rhetorically asked:

'The mangrove area is gone for good. So where should we now find our supo, u'a⁷, ke'u and mangrove fruits? We used to just collect shells in the mangroves for our late afternoon snacks, but our happy hour became a hungry hour!' (R81)

At the same time, informants consistently reported an increase of consumption of storable food brought in on logging barges, notably rice, canned tuna, noodles, sugar, tea and biscuits. Such imported food is highly appreciated for the variation it brings and for the way it lessens women's work burden: cooking rice and noodles is much less labour intensive than cooking root crops and fresh fish, the preparation of which takes two to three hours per meal (Pollard 1997). Moreover, when rough weather makes fishing impossible, the long shelf life of packaged food makes it suitable as high-calorie emergency food. Furthermore, the imported food is associated with 'progress' and 'modern' life.

In most cases, imported storable food merely complements, rather than completely transforms local diets. However, in situations where households are entirely reliant on logging wages, storable food almost completely replaces local food. A woman from East Are'are reflects on the time that she worked as maid for logging company Sam Lim San, while her father and brother also worked for the company:

'That time we did not work in the garden much because my mum's body was not very strong. So it all depended on me and my dad, but we were busy with our work for the company. My brother used to fish a lot, but he also worked for the company so he did not go fishing anymore. If we wanted to eat fresh fish, we had to buy it from fishermen, but we did not do that often. Before logging, we ate fresh fish almost every day, but when logging came it changed to maybe once a month only. During logging [. . .] [w]e ate

noodles and canned tuna in the morning, in the afternoon and in the evening. We changed from home food to store food.' (R115)

Logging also has substantial impacts on drinking water. Open freshwater sources regularly get polluted by logging-induced erosion and oil spills. Water pipes and wells often get damaged during logging road construction and felling activities. This issue was raised in 20 interviews (by 13 men and 7 women) and was pertinent to 48% of the villages and 57% of the logging operations (Table 1). Water systems that were broken as a result of logging-related activities were observed in four logging concessions. Interestingly, although this problem disproportionately affects women, as fetching water is considered to be a woman's task, men raised this issue almost twice as often as women. Both women and men indicated that this weighed heavily on women's work burden and that it delayed meal preparation. In several cases it meant that women had to walk further or paddle across open, rough seas to collect water. Damage to water systems by logging companies is a more general problem throughout Malaita, and companies rarely take responsibility for repairs (Pers. Comm. Gloria Siwainao, Provincial Environmental Health Officer, 2018).

Basic services

Despite these negative impacts on subsistence activities, logging also sparks rural Malaitans' hope that it will generate the basic services that the government poorly delivers.

Roads

Roads are the most anticipated of these services, given the limited road accessibility throughout Malaita. In Tariuna, in the interior of East Are'are (Figure 2), enthusiasm about a newly constructed logging road by Rite Trade Pacific in late 2017, was great, as expressed by this young mother:

'Before the road came, life was hard. [. . .] We women, when we were pregnant we had to walk down to the clinic [. . .] in Manawae [near Muki]. Now we can just ride on the truck.' (R150)

Licensees, land committee members and foreign operation managers actively fuel hope that these roads will literally pave the way for 'development':

'There are no long-term benefits from logging yet, but we want to make plans for the future. Road access is really our main aim for the future, but at this stage it's just a dream. We are [. . .] in a position to link the [interior] to the coastal areas and the towns. We also want the government to assist us in building a school and a hospital. It is only big thoughts right now, the real work must still happen.' (Male respondent from West Are'are, R124)

⁷ *Supo* (marine snail, *Melanoides* sp.), *u'a* (mud crab, *Scylla serrata*), *ke'u* (mud shell, *Polymesoda* sp.)

'Some people do not favour logging because there are negatives, but we come because government cannot fulfil some of its duties. [...] The company can construct roads. We are also partnering with the government [for] a proposed [...] high school [and] a hospital. We can assist by providing machine labour. Whether this will happen depends on the negotiations. [...] the company and licensee will provide assistance to landowners in a way they see fit. As licensees, our responsibility is to coordinate the operation and to supervise that [the company] fulfils the promises made [...] and at the same time we must make sure that the landowners don't over-use the company.' (Male licensee West Are'are, R126)

However, although multiple logging roads extend into to the island interior (Figure 8), the long desired connecting roads have not been built. Moreover, poor construction, lack of maintenance and an extremely wet climate, make most logging roads impassable within a year after logging operations end (see also Hobbis 2019).

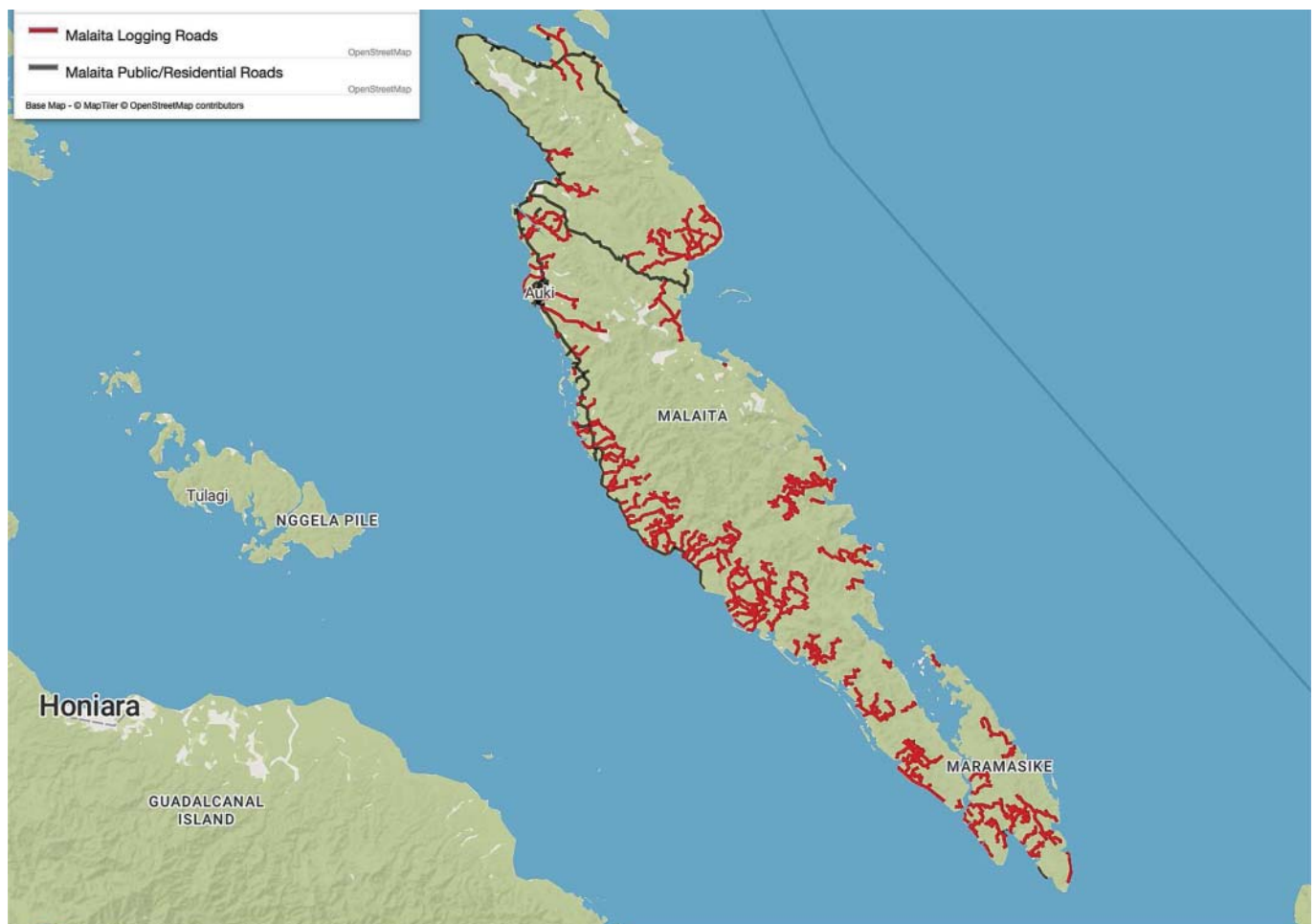
For instance, in 2015 the village of Haukona in the Are'are interior (Figure 2) was connected to a logging road built from the west coast by Rite Trade Pacific. After the company retreated in early 2017, potholes emerged and bridges collapsed. By mid-2018, a young man from Haukona reflected:

'We are back to walking. It takes us a full day [to walk to the coast] so we don't go down much anymore.' (R168)

Other development aspirations

The licensee, who is typically a well-educated man residing in Honiara, negotiates with the company about additional benefits on behalf of the landowners. The results of these negotiations are in theory included under the so-called 'Supplementary Conditions' in the Timber Rights Agreement to the logging license, but in practice commonly remain unformalized. Moreover, copies of the agreement are usually only held by the licensee⁸. This lack of transparency makes it hard for landowners to hold the licensee and the company accountable and complicates assessing the legitimacy of landowners' expectations.

FIGURE 8 Logging roads (red) and public roads (black) on Malaita (MapHubs 2019)



⁸ Additional copies should be kept by the Provincial Secretary (LALSU 2015), but repeated requests by the first author to study these remained unanswered.

Table 2 demonstrates the consistent mismatch between what landowners consider to have been promised by the licensee and logging company, and the extent to which this has been delivered within the duration of the logging operation⁹. As is clear from the right-most column in Table 2, in three logging operations that were still ongoing during the time of research, landowners had been told that their requests would be fulfilled after the next shipment of logs.

Social relations

A recurring theme in observations and experiences of interviewees in all research sites, is the impact that logging has on social relations in village settings. The following reflection by a man from East Are'are provides an apt summary:

'I do not know of a single case where logging has not led to conflict. [...] Logging pollutes the sea, the land, the bush, the river and the relationship between people. Everything touched by logging gets polluted.' (R4)

Conflict arises in four main areas, namely: 1) Company-clan relations; 2) Clan relations and gendered exclusion mechanisms; 3) Sexual exploitation; and 4) Alcohol abuse. Each of these will be detailed below.

1. Company-clan relations

The triangular relationship between landowners, licensees and companies is reportedly marked by perpetual strife. This issue was raised in 27 interviews (by 19 men and 8 women), and pertained to 44% of the villages in 64% of the logging operations (Table 1). The above demonstrated gap in expectations and realities surrounding benefit sharing is at the core of these tensions, but there are usually additional grievances.

A major source of conflict is the damage that logging operations cause to reefs, gardens, pig pens, sacred sites and drinking water systems, for which no effective complaint process and compensation procedures exist. In addition, the frequent delays in payment or underpayment of logging wages and royalties cause tensions. When meetings or strikes remain without result, disagreements sometimes turn violent, as was the case in southern Malaita in late 2015:

'It was a very unsafe time. Everyone suffered. The police came to control the situation but they were always at the log pond and were drunk most of the time.' (Woman from Afio R0)

In this and at least four other operations studied, logging companies responded to tensions with sudden and premature withdrawal, leaving hundreds of untransported logs felled by landowners and companies behind. Paradoxically, licensees then tend to arrange for a new logging company to come in to complete the task, often deepening the cycle of disillusionment.

2. Clan relations and gendered exclusion mechanisms

Second, logging-related conflict within and between clans is widespread. This problem was raised in 37 interviews (by 24 men and 13 women) and pertained to 60% of the villages and 57% of the logging operations (Table 1). Such conflict commonly starts with disagreement over whether or not logging companies should have been granted access to specific lands in the first place, and who has the right to make such decisions on behalf of the clan. Certain groups of people are systematically excluded from decision-making processes, which are based on the contested distinction between 'primary' and 'secondary' landownership rights (see also Allen *et al.* 2013: 21, Baines 2015: 13, Farran 2016: 186).

TABLE 2 *Benefits as negotiated and delivered in 14 logging operations on Malaita*¹⁰

Benefits	No. of logging operations (n=14)				
	Negotiated	Fully delivered	Incompletely delivered, company left	Not delivered, company left	Pending until next log shipment
Construction of school/kindergarten	10	1	2	4	3
Construction of clinic	2			1	1
Establishment of /improvement to water system	3			1	2
Construction of church	5			4	1
Providing tin roofing	7		1	4	2
Construction of wharf	2		1	1	
Improvement of soccer field	2	1	1		
Levelling village grounds with logging machinery	3			2	1

⁹ This table is based primarily on triangulated interviews with landowners, complemented to a lesser extent with interviews with licensees, company officers and on-site observations.

¹⁰ See Minter *et al.* (2018: 21–22) for more detailed accounts per operation.

According to some informants, only 'primary right holders' have culturally defined decision-making rights, with 'primary right holders' being loosely defined as those who can claim descentance from the first settlers in a given land area. In Malaita, married women usually move to the clan area of their husbands, where they are considered to only have 'secondary', or usufruct rights. This then excludes them from making decisions about and receiving royalties from logging in that area. In contrast, other informants argue that there never was a distinction between 'primary' and 'secondary' rights until colonial administrators introduced it in the process of land appropriation for the establishment of government stations. Even so, in practice the 'primary rights' narrative works as a powerful mechanism of exclusion.

Regardless of the above discussion, women are not part of logging-related decision-making and royalty schemes on their birth land either. As a result, many women are critical of logging:

'We are [...] not part of any of the [...] committees. [Men] look at us as if we are not big, they look at themselves as big only. Also, the loggers only talked about the positive side. The licensee [...] called a meeting [...], but they only invited the people who are pro-logging. I went there too because I wanted to know what's going on. I spoke out during that meeting and said that they should also include women in the logging committees, but they did not respond. Some men are open to it, but they did not put it into action.' (R125, West Are'are)

'One thing that I do not like about logging is this. Is it prohibited to let us women be part of the committees or the agreements? Logging comes to everyone, men and women, so why can we not be part of it?' (R94, East Are'are)

The key moment for obtaining landowners' consent is the Timber Rights Hearing, which is essentially a meeting between the license applicant and representatives of the landowners of each parcel of land, with delegates of the Provincial Government present overseeing the process and acting as the secretariat. While all people potentially affected by the proposed logging are entitled to be informed about the meeting (Farran 2016: 188, LALSU 2015: 81), a common grievance among informants across logging operations is that in practice only people pre-selected by the license applicant are informed and invited. Moreover, even if there is explicit resistance to logging during these meetings, procedures for objecting are complicated, costly and have to happen within a short period of time (one month) (LALSU 2015: 78).

Following these contentious and exclusionary procedures, discord endures during the logging operation itself, when it is usually aggravated by accusations of mismanagement of logging revenues among clan members. The deep rifts this gives rise to can be sensed from this reflection by an adolescent man from East Are'are:

'Logging makes life not much good. Before the logging operations the community was at peace, we were united, we worked together, religion was strong. After logging

came, these values and others like caring for each other and supporting each other, disappeared and turned the opposite.' (R21)

3. Sexual exploitation

Logging operations are associated with exploitative sexual relations between incoming logging personnel and local girls and women, which causes deep local resentment. This issue was raised in 49 interviews (by 25 men and 24 women), pertaining to 52% of the villages and 71% of the logging operations (Table 1). It leads to an increase in teenage pregnancies, school drop-out rates, and fatherless children. Logging companies usually prohibit their non-local workers to have sexual relations with local girls, but:

'Here in [our village] alone we have around five [babies born from sexual encounters with expatriate logging staff], but the fathers are already gone. We have chiefs here, but they don't play their role. They should keep an eye on these things, but they don't. We parents are weak, and the chiefs are weak too' (R133, West Are'are).

In several logging operations, chiefs and village leaders were found to discourage women and girls to ride on logging trucks for safety reasons, which takes away the earlier mentioned advantage of hitchhiking to gardens. And while many mothers forbid their daughters to visit logging camps and log ponds, this is often unavoidable as they have to be crossed on the way to school or gardens. A mother comments:

'[...] there is security on the log pond, but they don't pay attention to the girls [...]. They are paid to protect the machines, so that's what they do, but nobody protects our girls.' (R118, West Are'are).

In addition, both men and women say marital relations often get strained when husbands are employed by the company, because most of the wages are spent at the company store, on alcohol or on mistresses. A former male logging employee speaks from experience:

'Many men take girlfriends because suddenly they have money to spend. But as soon as the money is finished, the girlfriends disappear, and by that time he has already lost his wife too. So when the money is gone, he doesn't have anything left in life.' (R6)

4. Alcohol abuse

Finally, all of these different and intertwined tensions are heightened by increased and problematic alcohol consumption, an issue that was raised in 37 interviews (by 12 men and 25 women), and pertained to 56% of the villages and 64% of the logging operations (Table 1, Figure 9). The sale and consumption of alcoholic beverages on logging companies' premises is generally prohibited, but enforcement is poor.

Moreover, companies facilitate the local sale of beer by allowing its transportation on logging barges to supply village bottleshops. This further increases social disruption at all levels, as was pointed out by this woman from West Are'are:

FIGURE 9 Residents' attempt to regulate alcohol consumption near a log pond in West Are'are (Minter 2018)



'Alcohol is disturbing the whole community now. Before logging, drinking would only happen when it was time to celebrate, but now it happens Monday to Sunday. The young and the old, everyone drinks and it happens everywhere too. Before, drinking would happen at the edge of the village, now it happens in the middle of it, within the view and hearing of children, who see and hear all the swearing and the fighting.[...] Women get frustrated too when their husbands spend all the money they earn on beer. So to get it balanced, they also start drinking. And then a lot of fighting happens inside the house and the children don't know where to run to anymore.' (R125)

DISCUSSION

Logging benefits do not trickle down to rural communities

The Solomon Islands' logging industry has been claimed to significantly contribute to local rural economies through employment, revenues and infrastructure (MOFR 2020, Pauku 2009), but the scant literature on the subject and the data for Malaita presented in this paper show the opposite.

It is estimated that the sector generates 'perhaps' 5,000 jobs nationwide (IMF 2020:14, World Bank 2017), but this figure provides no insight in the nature and duration of such jobs. This study has shown that the number of local workers hired per operation relative to the total population affected is low, employment is highly temporary and insecure, wages are low, payment delays are common, working hours are long and inhibit undertaking other economic activities, and as meals are only provided for foreign workers, local labourers spend considerable shares of their wages on food from the company store.

Similar limited contributions of logging companies to local employment have been demonstrated by Lescuyer *et al.* (2012) for Cameroon and by Asanzi *et al.* (2014) for Zambia. Both studies highlight that most locally generated jobs are low-paid and casual, while better positions and labour conditions are reserved for external workers. In a global literature review on the local benefits of industrial roundwood plantations, Charnley (2005) concludes that the sector does not

contribute to substantial employment in rural areas and rarely creates jobs for people who are already politically and economically marginalized.

The results further underscore earlier reports that royalty payments benefit only a few people and do not contribute to structural development (Allen *et al.* 2013, Farran 2016, Frazer 1997, Kabutaulaka 2000). The onus of redistribution of royalties rests on the licensee and the 'land committees', the local institutions representing the collective of customary landowners. However, as has been shown for other contexts, it is too often naively assumed that in situations where land and resources are collectively owned, collective interests will naturally prevail over individual interests (Scudder *et al.* 2019, Singer 2008). This is especially true with respect to the management of the money resulting from the commodification of such land and resources. Moreover, the negotiation process as a whole is hampered by the highly uneven knowledge, power and financial means of the company, licensee and landowners (see also Farran 2016).

In the Malaitan socio-political context, both 'Big Men' and Chiefs are central political figures, sometimes in combination. Chiefs derive status from lineage, albeit historically with several in-built checks and balances. In contrast, 'Big Men' generate and maintain status and loyalty through distribution of wealth (Farran 2016, Kabutaulaka 2000, Turnbull 2002). Licensees often take on the role of 'Big Men', and land committees tend to be composed of those loyal to the licensee. This is reflected in the commonly expressed view that royalties are only received by those close to the licensee.

An additional way in which the industry is assumed to contribute to rural development is through annual provincial logging fees, which companies are supposed to pay on a yearly basis. However, most companies have a poor track record in paying their dues and the Provincial Government of Malaita is unable to hold them accountable. In November 2019, the 21 logging companies operating on Malaita had an outstanding debt of SBD 4.6 million (USD 572,435) worth of provincial logging fees (Saeni 2019), equalling roughly 12% of the provincial budget for that year (Lofana 2020). By May 2020, only six of these companies had settled their bills (Iroga 2020).

As a result, the assumption that logging revenues will trickle down to local communities through employment or revenues doesn't hold. The only available quantification of the contribution of logging to household income estimated that logging provided a temporary (12–18 months) increase of 15% in average household income in the early 1990s (Fitzgerald and Schoeffel 1991 in Frazer 1997: 9). In a more recent study, only 0.1% of over 3,400 surveyed Solomon Islanders reported logging as an important source of cash income (ANU-USP 2013). The claim by the IMF (2020: 14) that 'household consumption is linked to cycles in logging', suggests a far larger contribution of logging to the rural economy than the evidence justifies.

Finally, the suggestion that logging contributes to local infrastructure development (Pauku 2009: 26) is equally flawed. The Solomon Islands Government is largely absent in rural areas and in these 'spaces of statelessness' (Allen

2017 in World Bank 2017: 25) landowners indeed view logging operations as a rare opportunity to obtain public services that government fails to provide, notably roads, clinics and schools.

However, although logging companies may have in some Central African contexts displayed para-statal behaviour (Singer 2008) and sometimes significantly contributed to road infrastructure (Lescuyer *et al.* 2012), in Solomon Islands this has never been the case. Moreover, similar to Cameroon and Zambia (Asanzi *et al.* 2014, Lescuyer *et al.* 2012, Defo 2020), logging companies' delivery of other development benefits is poor. At best, they have engaged in 'symbolically laden forms of gift giving' (Hardin 2011: 17), such as sponsoring ancestor worshipping rituals, funerals, soccer teams, petrol allowances for a select elite or ceremonial food sharing.

Logging undermines subsistence livelihoods

Logging operations, unregulated as they are, undermine the subsistence economy. Even though cash dependency has much increased in recent decades, for the overwhelming majority of Malaitans, and Solomon Islanders more generally, fishing and swidden cultivation still generate the bulk of daily food (Schwarz *et al.* 2013, van der Ploeg *et al.* 2016). Moreover, for those with paid jobs, in times of crisis when employment is uncertain, subsistence livelihoods continue to be the main safety net (Posso and Clarke 2014), the COVID pandemic being a vivid illustration (Eriksson *et al.* 2020).

However, such subsistence impacts are rarely quantified. The only study that has ever calculated the monetary impacts of logging on Solomon Islands' subsistence economy, found that a logging operation in Choiseul resulted in a net annual loss of SBD 7,545 per household (this was after royalty payments had been deducted). This was the result of damage to gardens, trees that were used for construction and canoe building, and numerous other forest products (Cassells 1993).

Similar impacts from logging on subsistence livelihoods have been documented for other parts of the world (e.g. Counsell *et al.* 2007, Headland and Headland 1997, Mousseau and Lau 2015, Persoon 2008, Watson 1996). While the effects on non-timber forest products are particularly well-known (Ndoye and Tieguhong 2004), this study has specifically highlighted the perceived relationship between logging and fisheries that has also been documented in ecological studies.

There is increasing scientific evidence of the negative impact of logging on freshwater and marine ecosystems. In particular, the creation of log ponds and unpaved roads result in high increases in, sometimes toxic, sediment load on coral reefs and in rivers (e.g. Bégin *et al.* 2014, Boboria *et al.* 2021, Hamilton *et al.* 2017, Wenger *et al.* 2018, 2020). Fish and shellfish being the main sources of animal protein in Solomon Islands' diets (Albert *et al.* 2020), these impacts increase the risk of malnutrition (SIG 2017, Minter *et al.* 2018).

These concerns are compounded by the negative impacts of logging on both open freshwater sources and piped water systems (see also Global Witness 2018). With nearly 90% of rural Malaitans depending on either of these two for drinking water (MHMS 2015), this forms a public health hazard (but see Albert *et al.* 2021 for similar impacts on urban populations).

For all these forms of damage to subsistence livelihoods, landowners are often chronically immersed in complaint and compensation procedures, which mostly remain unanswered. The lack of government presence means that logging companies can *de facto* operate unchecked. Many people feel structurally unsupported by government authorities in logging disputes and by the police in particular, who are viewed as only protecting logging companies and their interests (Allen *et al.* 2013: 54–5). Some authors have suggested that the occasional acts of violence against logging personnel or their equipment¹¹ must be seen in the light of this failing justice system (e.g. Baines 2015: 14).

Logging causes social disruption

Much of the social discord documented in this paper stems from the fact that logging is not based on broad acceptance, but on decisions of a small, male elite. While it is also mainly this select group who benefit from logging, this comes at the expense of the rights and livelihoods of others.

Women in particular see the fewest benefits and carry most of the burdens. The male dominated character of the logging industry itself, and the way that land rights and decision-making processes regarding land and resources are locally organized, work together towards the systematic exclusion of women from both the management and potential benefits of logging. Similar trends have been described for the situation surrounding extractive industries in Papua New Guinea (Macintyre 2003, 2007).

Especially worrying is the sexual exploitation of local girls and women by logging personnel. While this problem as well as the associated health risks have long been noted (Allen *et al.* 2013, Buchanan 2017, Herbert 2007, IOM 2019, John 2017, Raomae 2010, Runa 2018, Sanga 2017, Toito'ona 2017, World Bank 2017), it remains unaddressed.

Over two decades ago, Roughan (1997: 160) wrote about Solomon Islands: 'Commercial logging, like no other issue, has split the young nation. [...] no other single activity has caused so much hurt and distrust and produced a growing gap of suspicion among families and clan lines and between provinces and the central government'. Roughan's observation is repeated in a qualitative study on the sources of conflict and grievances in 86 rural communities in five of Solomon Islands' nine provinces, including Malaita, by Allen *et al.* (2013: xi, 21–23), who conclude that: 'Those areas that were in the midst of, or had recently experienced, logging activities

¹¹ See for example: <https://www.solomonstarnews.com/index.php/item/10775-dispute-deepens>, <https://www.solomonstarnews.com/index.php/news/national/item/21153-logging-machines-burntdown-in-dispute>, <https://www.rnz.co.nz/international/pacific-news/336731/more-logging-machines-burnt-in-solomons>

were generally the most fractious and dysfunctional, with substantial social order problems and crime.'

Thus, the most alarming aspect of the social impacts of logging that this paper documents is that they are nothing new. They arose as soon as commercial logging became the mainstay of the Solomon Islands Government's development strategy in the early 1980s, and have since persisted and deepened. Successive administrations have welcomed the industry and become increasingly entangled with it (Porter and Allen 2015), at a very high social cost. The only government that was critical of logging (the National Coalition Partnership 1993–1994) was brought down mainly because of its attempts to reform the forestry sector (Frazer 1997).

History has shown how serious the consequences of elite capture of logging benefits may be. It is increasingly acknowledged that the destabilizing effect of the close ties between the logging industry and the political elite is among the root causes of the 'Tension'. Given that these ties still exist and have arguably further intensified (Bennett 2002, Allen and Porter 2016, Farran 2016), the safeguarding of peace and stability remains a serious concern.

CONCLUSION

The development narrative that has justified Solomon Islands' reliance on foreign-led export logging for four decades, fails to take into account the local level social impacts of the logging industry. This macro-economic perspective structurally overlooks and undervalues the subsistence economy and its associated social structures, which together form the foundation of sustenance and well-being for the large majority of Solomon Islanders.

Logging benefits do not trickle down to forest dependent communities due to logging companies' poor compliance with financial obligations, the lack of transparent benefit sharing agreements, and elite capture at all levels of the Solomon Islands' political economy. Moreover, the focus on roundwood production and export, rather than timber milling and processing, makes the industry relatively labour extensive.

Moreover, in the absence of State regulation, logging companies and their intermediaries operate virtually without checks and balances which in turn results in very poor logging practices, both environmentally and socially. Haphazard log pond and road construction at the expense of mangrove forests, coral reefs, swidden fields and water systems, combined with overharvesting and oil spills, severely damage the local subsistence base. Simultaneously, the lack of political oversight facilitates sexual exploitation of women and girls and excessive alcohol consumption.

What stands out from the impacts of logging on both subsistence activities and social relations, is that women are disproportionately affected. This pattern is both caused and perpetuated by women's structural exclusion from decision-making relating to logging operations. Thus, in a context of already alarming gender disparities and gender-based violence, logging reinforces gender inequity.

In order to move forward, the realities of people in the rural areas will have to become a central factor in forest policy and development planning. This means an explicit valuation of the subsistence economy, which rather than continuously emphasizing the importance of logging as a source of national revenue, emphasizes the importance of gardening and fisheries for Solomon Islanders' sustenance and wellbeing.

Clearly, this will require fundamental reorganization of the logging sector. An important potential avenue for change is offered by two recent related developments. First, the ongoing review of the outdated FRTUA might result in more equitable and transparent logging agreements, legal prescriptions on citizen representation and participation in decision-making, as well as effective grievance mechanisms. In order for this to happen, however, it is paramount that the forest industry itself is granted a much more modest role in the review process than has been the case in earlier failed attempts to revise the act.

Second, the endorsement of the National Forest Policy 2020 is a key step in acknowledging, by the Ministry of Forestry and Research itself, the systemic problems that the forestry sector faces in terms of sustainability, governance and social outcomes. Of the ten principles that guide the policy, the most promising include effective monitoring and law enforcement, multi-stakeholder participation, multi-sectoral engagement, and respect for culture and human rights.

Only when there is full commitment throughout the forestry sector, to address the negative impacts of logging on subsistence livelihoods and social relations, and on women in particular, will these principles stand a chance of resulting in structural improvements in the everyday lives of women and men in Solomon Islands.

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Changing lifestyles in converted forests: the impact of logging operations on the Orang Rimba, Jambi, Indonesia

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HIGHLIGHTS

- The social impact of logging operations can only be understood as the cumulative effect of a long range of interconnected land use changes.
- The Orang Rimba, the original forest dwellers of Central Sumatra, have been heavily influenced by extensive logging operations over the past few decades.
- Contrary to early predictions, they have survived mainly by adapting to the changing conditions but also by avoiding complete assimilation.
- Governmental efforts to bring the Orang Rimba into the national socio-economic mainstream have had limited success.
- The international discourse on Indigenous peoples has to a limited extent trickled down in Indonesia with some positive effects on the forest dwelling communities.

SUMMARY

The landscape of Central Sumatra has changed rapidly over the past few decades. Industrial logging and the subsequent conversion of the lowland rainforests into oil palm and rubber plantations, the establishment of transmigration sites and the ever-expanding road network have forced the forest dwelling communities of the Orang Rimba to adapt their traditional modes of subsistence. Traditional hunting, fishing and gathering simply did not yield enough food and forest products for exchange purposes anymore. In this contribution an overview will be given of the impact of large-scale logging and the processes of forest conversion that have taken place in the wake of the logging operations. The article covers a period of about four decades in which fieldwork by both authors has taken place at various periods. It will show the various ways the Orang Rimba have reacted to the challenges and the opportunities that emerged as a result of these operations.

Keywords: social impact, Orang Rimba, Sumatra /Indonesia, adaptation, survival

Modes de vie en mutation en forêts converties: l'impact de l'exploitation forestière sur les Orang Rimba (Jambi, Indonésie)

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Au cours des dernières décennies, le paysage du Sumatra central a connu un changement rapide. L'exploitation forestière industrielle et la conversion subséquente des forêts pluviales de plaine en plantations de palmiers à huile et de caoutchouc, l'installation de sites de transmigration et l'expansion continue du réseau routier ont contraint les communautés des Orang Rimba, vivant au sein des forêts, à adapter leurs modes de subsistance traditionnels. La chasse, la pêche et la cueillette traditionnelles ne produisaient plus assez de nourriture et de produits forestiers pour les échanges. Le présent article donne un aperçu de l'impact de l'exploitation forestière à grande échelle et des processus de conversion de la forêt qui ont eu lieu dans le sillage des opérations d'exploitation. L'article couvre une période d'environ quatre décennies au cours de laquelle le travail de terrain a eu lieu à différentes périodes. Sont abordées les multiples façons dont les Orang Rimba ont réagi aux défis et aux opportunités qui ont émergé à la suite de ces opérations.

Cambio de estilos de vida en los bosques convertidos: el impacto de las explotaciones forestales en los Orang Rimba de Jambi (Indonesia)

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El paisaje de Sumatra Central ha cambiado rápidamente en las últimas décadas. La tala industrial y la posterior conversión de los bosques tropicales de tierras bajas en plantaciones de palma de aceite y caucho, el establecimiento de focos de trans migración y la red de carreteras en constante expansión han obligado a las comunidades de los Orang Rimba que viven en el bosque a adaptar sus medios de vida tradicionales. La caza, la pesca y la recolección tradicionales ya no producen suficientes alimentos y productos forestales para el trueque. En este trabajo se presenta una visión general del impacto de la tala a gran escala y de los procesos de conversión forestal que han tenido lugar tras las operaciones de tala. El artículo abarca un periodo de unas cuatro décadas en las que se han realizado trabajos de campo en varios periodos. Se muestran las diversas formas en que los Orang Rimba han respondido a los retos y a las oportunidades que surgieron como resultado de estas operaciones.

INTRODUCTION

Since the 1970s industrial logging increased in intensity and scope in many countries in the tropical rainforests of Asia, Africa and Latin America. Large scale logging operations were stimulated by the rapidly increasing demand for tropical timber in many western countries including Japan, which successfully protected its domestic forests. In addition to the demand for timber, forests were also being harvested in order to make land available for plantations of agricultural crops including industrial crops like rubber, coconuts or palm oil and edible fruits such as pineapple. It took a few years before the impact of this large-scale deforestation and forest conversion on the life of forest dwelling communities started to attract the attention of scientists but towards the end of the 1980s there was a public outcry once the injustice done to the Penan of Sarawak became widely publicized through some messages and photographs that were smuggled out of Sarawak on the Malaysian part of Borneo by the Swiss Bruno Manser (Manser 1996, Brosius 2008). This soon led to a boycott of Malaysian timber by the European parliament. At the same time the awareness among the general public started to grow about the hidden costs in the production of timber and serious impacts on the life of Indigenous forest dwellers. Within a couple of years this would lead to inclusion of Indigenous rights in principles and criteria for sustainable timber production in certification systems like FSC (Forest Stewardship Council) and PEFC (Programme for Endorsement of Forest Certification). Some countries, including the Netherlands, started to formulate their first policies towards tropical rainforests and their inhabitants in relation to the import and use of timber for various purposes. In addition to the ecological impact, there were also serious concerns about the impact on the life of the Indigenous forest dwellers (see for instance Gabor and Pronk 1991). Gradually the discussion would widen to include timber from the temperate and boreal zones.

At the end of the 1980s and in the 1990s numerous studies started to appear on the impact of the large logging operations in various countries like Brazil, Indonesia, the Philippines and many others (Davis 1977, The Ecologist 1985, Denslow and Padock 1988). At the same time advocacy groups for the rights of Indigenous peoples like Survival International (SI), Cultural Survival (CS) and the International Working Group on Indigenous Affairs (IWGIA) started to focus on effects on such groups. In many of the field studies carried out among these forest dwellers there was an image of them being turned into the victims of the logging operations and forest conversion. In these publications strong wording was used to describe the impact on such peoples. And in general, predictions for their future were phrased in extremely negative or pessimistic terms like 'vanishing peoples', 'tribal extinction' or 'death in the forest', calling for immediate protective actions from governments to undo or at least reduce the negative impact for such peoples (Eder 1987, Vitug 1993, Sponsel *et al.* 1996, Tempo 1990, Bahuchet *et al.* 2001).

It would take a few years before the first internationally accepted legal framework for the protection of the territorial and cultural rights of Indigenous peoples were formulated and

put into practice. The Convention on Biological Diversity of 1992 did not provide a sufficient basis to that end while the stronger language of ILO Convention 169, adopted in 1989, remained largely unused because it was not ratified by most countries involved in these logging operations or in the international timber trade. In the meantime, however, and partly based on some widely published scandals of seriously harmed Indigenous peoples, many internationally operating organizations like the World Bank, Asian Development Bank and also international conservation agencies like WWF and IUCN started to formulate their policy guidelines for the protection of Indigenous peoples. A major landmark in this development was the adoption of the UN Declaration on the Rights of Indigenous Peoples in September 2007. Since that date, the protective measures and policy instruments for the involvement of Indigenous peoples in decisions about interventions in their territories, like Free, Prior and Informed Consent (FPIC), have trickled down in international law and in the policy guidelines of most organizations and agencies dealing with Indigenous peoples. To what extent these policies are actually implied and whether they lead to reduced impact in the life of the Indigenous peoples is difficult to determine. For many of them such protective measures have only come at a fairly late stage. Much has happened already in terms of logging and forest conversion in the few decades before such protective measures were formulated and implemented, often quite reluctantly (Rombouts 2014).

In this contribution to the Special Issue of the International Forestry Review we want to discuss the ways the Orang Rimba of Central Sumatra (Jambi Province) have reacted towards the large logging operations and the conversion processes of the lowland forests in their home territories since the 1970s. Though it was quite clear in the early stages of logging operations that the Orang Rimba were suffering from the degradation of their environment, Indonesia was slow in recognizing the serious impact of logging on the life of its forest-dwelling communities. That has to some extent changed in recent years as a result of the strong lobby of the Indigenous peoples' movement in the country, changes in cultural policies and a number of crucial court decisions in favour of Indigenous rights (Suryani 2021, Arizona 2022). In order to describe the course of events in Central Sumatra, it is necessary to describe the methodology of how to study 'impact' over a longer period of time and highlight the wider social and ecological context of the traditional home territory of the Orang Rimba. As this article is largely based on a number of periods of field research that have taken place over a few decades, data collection was of a special nature, that will be described in the section on methods.

Social impact of logging

Methodologically, the research question 'What are the social impacts of logging?' which is the leading question of this Special Issue, seems a rather straight forward one. Logging operations lead to all kinds effects and part of them will be related to the communities that live in or near the forest in which these operations are taking place. These effects could

be described, analyzed and explained making use of available theories and comparative studies. However, when looking more closely on the ground and looking over a longer period of time, the situation is more complex. On the basis of observed and described existing conditions, there can be various types of causal explanations. One of them consists of all the bio-physical changes that occur in the forest environment and could be related to the ways forest-dwelling communities continue to make use of the forest's resources under the changing conditions. The other type of explanation involves the intentions of members of societies including their perceptions on which they base their actions. Explanations should, according to Vayda and Walters (2011), be made through finding out the causal history of 'events', or by exploring the causal chains that lead to the 'events', which are defined as something happening somewhere at a particular interval of time. It is argued that the causal chain of events that actually did happen, can be contrasted with events that did not occur even though, based on theoretical or practical assumptions, they were likely to happen (Vayda and Walters 2011, 2-7).

Applying this line of reasoning to the key question "*What are the social impacts of logging?*" calls for causal chains of events or conditions that could be ascribed to logging operations within a particular area. Much has been written about the direct impact of logging operations, including the development of infrastructure like a road network, on forest-dwelling populations (FAO 1999, Bahuchet *et al.* 2001, Laurence *et al.* 2009, Cairns 2015). Usually, such impact is described and explained in terms of causal reasoning. Because of the logging operations there are changes in the environment and also in the social-cultural context in which these people live. Or, as eloquently described by Ley Tuck-Po in her book about the Batek in peninsular Malaysia, the 'pathways' through the forest, in a literal as well as metaphorical sense, are changing (Lye 2018). This impact however is not a static State of affairs. Logging operations, including the felling of trees and extraction of the logs, often require the development of a road network. These operations will also bring workers into the area who gradually develop various kinds of interaction with the forest dwelling communities. At a later stage new migrants might enter the area in the wake of the logging companies in search of arable land. Logging camps with saw-mills often develop into small settlements, attracting new people and new activities, like grocery shops and restaurants. As a result the population density will increase leading to more interaction with the original forest dwellers. In other words, as time passes, what started as the direct impact of straightforward logging operations, will gradually develop in a complex chain of new events and conditions which can in themselves be described and explained again as causes and effects of the newly created situation. Forest roads for instance, which were initially constructed to extract the logs, are often improved over time and this, in itself, will have additional impacts on top of the logging operations, in terms of new people arriving or trade opportunities being promoted (see for instance Laurence *et al.* 2009).

In some cases it is useful to differentiate between direct and indirect impacts of a particular action (see for instance

FAO 1999) but over time this difference may lose its relevance, also because of the joint and cumulative nature of causes and effects (FAO 1999). Paradoxically, one could argue that even the support for rights of Indigenous peoples that emerges on the basis of dramatic events inside the forest was triggered by the logging operations. In the causal history of providing support for these communities, the logging operations feature prominently as the cause that has motivated certain individuals or organizations to take action to undo or reduce the further marginalization of the forest dwelling communities.

By contrasting the causal chains of events related to the impact of logging, with events that did not happen, but that were predicted in numerous cases, it is clear that forest dwelling communities could not only or predominantly be described as just 'victims'. Nor did they go extinct, and neither were they completely assimilated. Though the impact of logging was large, dramatic and manifold, concepts like 'victimization', 'ethnic extinction' or 'complete assimilation' do not sufficiently describe how the people involved have reacted to the logging operations over longer periods of time. Under these rapidly changing conditions, they have also looked for new opportunities to cope with the new challenges. They were not just the passive victims of powerful external interventions in their area. So, in analyzing the causal chain leading up to their present conditions there should also be room for their creative knowledge and adaptations. This intra-cultural variation in patterns of the Orang Rimba's reactions to the cumulative impacts of logging, has triggered the effort to present this overview in the context of this Special Issue.

METHODS

This article is based on fieldwork that was conducted among the Orang Rimba by both authors. The duration of the fieldwork periods varied in length of short visits to more extended periods of several months. The first visit of the first author into the area was made in 1983 and the last visit took place in 2013. Though the reasons for visiting the Orang Rimba were varied, the main methods that were applied were ethnographic and anthropological research methods, that is structured and unstructured observation, interviewing various groups of informants and participant observation by living as close as possible with the Orang Rimba in their small camps. In addition to the discussions with Orang Rimba, interviews were also conducted with relevant outsiders like governmental officials, managers of logging camps, missionaries and staff members of NGOs working in the area.

The initial visit of the first author to this area took place in the context of an evaluation mission to study the impact of processes of religious conversion among the Orang Rimba in 1983. In 1985 more extensive fieldwork was done as part of his PhD work aimed to study, in a comparative perspective, both the impact of logging operations and the effects of the governmental policies to resettle the Orang Rimba. A year later he was asked to join as a supervisor a field excursion of

the international students at the School for Nature Management of the Indonesian Ministry of Forestry to study the impact of the newly declared protected area of Bukit Duabelas on the lifestyle of the Orang Rimba. In later years he regularly visited the area in the context of various research or consultancy projects in which the changes among the Orang Rimba were a crucial aspect. The last visit took place in 2013 together with Dr. Tessa Minter, one of the editors of this Special Issue, to supervise one of our PhD students E.M. Wardani, the second author, who was conducting fieldwork among various groups of Orang Rimba with a focus on food production and consumption under highly diverse environmental conditions. Already at an earlier stage Wardani had conducted fieldwork among the Orang Rimba in 2006. She returned to Central Jambi for data collection for her PhD at the end of 2012 and spent the next year almost entirely in the field, focusing on the Bukit Duabelas area. First she worked with the Terab and Sako Tulang groups before moving to the Air Hitam area, south of the mountain range. Additional field visits were made in January/February and August 2014, March 2015 and May/June 2016. The fieldwork aimed to collect information on the food intake and the food security among three groups of Orang Rimba. Detailed records of daily food intake and the ways this food was produced of obtained formed the basis of the analysis (Wardani 2022). The research was sponsored by the Louwes Fund for Research on Water and Food, administered by Leiden University.

During all these visits extensive notes were taken about the composition of the groups, the settlements, the various types of economic activities (such as hunting, fishing, gathering, gardening, rubber tapping, or wage labour), the interaction with outsiders (chain saw operators, truck drivers, camp managers, Malay farmers, governmental officials and missionaries) and their material possessions in and around their camps. Photographs were taken to document during these visits. These images provide a useful point of reference for comparison and the changes that have taken place over time. The focus of the fieldwork over the years has always been the central part of Jambi, that is the vast area around what is now called the Bukit Duabelas National Park but, whenever there was an opportunity, visits were also made to other Orang Rimba groups like those along the Trans Sumatra Highway.

In addition to the fieldwork, use was made of the available literature, including anthropological and ethnographic studies. In addition, reports of governmental agencies, NGOs publications and news items in the public media that paid attention to the situation of the Orang Rimba proved to be relevant. In comparison with many other relatively small ethnic groups in Indonesia, the Jakarta-based newspapers like Kompas, Media and Sinar Harapan often report on the situation of the Orang Rimba (CSIS 1994–2021).

MAP 1 Map of Sumatra with roughly indicated the traditional home territory of the Orang Rimba



The Orang Rimba

The total number of Orang Rimba is estimated at about 3,800 to 4,000 people (Elkholy 2016, Prasetyo 2015, Wardani 2022). Sumatra is, together with the Indonesian parts of Borneo, one of the most deforested tropical rainforest areas in the world (FWI/GFW 2002, FAO 2020). This process had started already in the Dutch colonial time with the establishment of some plantations and road constructions, but particularly since the beginning of the New Order regime of President Suharto (1966–1998), the scale and speed of forest conversion rapidly increased. The establishment of plantations for industrial crops like rubber or palm oil, mining operations for coal and minerals and the establishment of transmigration sites for migrants from the overpopulated islands of Java, Bali and Madura, have seriously damaged the lowland rainforests of Sumatra, leaving only small areas with a protection status relatively intact (Cribb 2010).

The people who call themselves Orang Rimba, literally 'People of the Forest', were referred to as 'Kubu' or Koeboe' in the early writings at the beginning of the 20th century¹. One idea that was dominant in those writings, was that the poor hunter-gatherers in the extended lowland forests of Central Sumatra would not be able to continue their lifestyle in the long run. Their traditional area covered part of the province of Jambi as well as the southern part of the province of Riau and

¹ The people who are now called Orang Rimba, were for a long time known in the ethnographic literature as the Kubu (in the past sometimes also spelled as Koeboe or (in Dutch plural form) Koeboes). This term was most likely taken over from the Malay people who called the forest dwellers, Orang Kubu. This term, with its negative connotations of being 'primitive' and 'dirty', was generally used until the 1990's (see for instance Sandbukt 1988, and Persoon 1994). The Indonesian government started to use Suku Anak Dalam to refer to them in the 1970s when it became clear that the people themselves did not want to be called Kubu. In later years they have adopted the term Orang Rimba that is now widely used, both in the area among themselves but also in the ethnographic literature as well as in government documents (Hidayah 2020). In this contribution Orang Rimba is used to refer to these people unless older sources are quoted.

FIGURE 1 Two Orang Rimba men on their way with meat of a hunted tapir. Sharing of food, and meat in particular, with other families is an important element in their social relations (Central Jambi, 1985) (© G.A. Persoon)



the northern part of the province of South Sumatra. In most of the reports written by colonial officials and ethnographers, it was predicted that they would have to give up their way of life as a result of the encroaching outside world (Van Dongen 1906 and 1910, Hagen 1908, Keerweer 1940). Conversion of rainforest in this part of the island into oil palm and rubber plantations and the slowly expanding agricultural activities of the so-called Orang Melayu, or Malay people, named after the dominant ethnic group in this area, would make it impossible for the Orang Rimba to continue their way of life. This prediction however did not materialize. Even though the conversion processes of the lowland rainforest would increase dramatically after the World War II and in particular since the late 1970s, the Orang Rimba have still survived until this day in the central part of Sumatra. Their modes of life however have changed as a result of these conversion processes. In

various ways the Orang Rimba have reacted to the challenges and the opportunities that emerged as a result of the large-scale logging operations and the subsequent conversion of the forests into other types of land use (Sandbukt 1988, Prasetyo 2015, Elkholy 2001, 2016, Wardani 2022).

Little is known about the origin of the Orang Rimba and there is still discussion whether or not they are what is being called 'primary hunter/gatherers' or a kind of 'secondary hunter/gatherers' who have fled for various reasons from agricultural societies in order to escape from slavery or other forms of exploitation. However, from the earliest reports, and since the times of their 'discovery', the Orang Rimba have always been described as extremely primitive hunter gatherers, who have retreated in the forests of this part of Sumatra (Van Dongen 1906 and 1910, Hagen 1908, Van Waterschoot van der Gracht 1915, Adam 1928, Loeb 1974). They maintained very limited contacts with the outside world through a system of so-called 'silent barter', through which they were exchanging forest products for a variety of exchange products with the Malay farmers and traders (Van Eerde 1929). A *jenang* served as an intermediary between the Orang Rimba and Orang Melayu, the dominant population in this part of Sumatra, who were living in villages along the banks of the major rivers.

The Orang Rimba lived in relatively small bands within a particular watershed. A number of such bands formed a larger social group, numbering up to a few hundred people, usually named after the watershed within which they were living. People would be referred to as the Orang Rimba of Air Hitam, Mengkakil or any other river. Each of these larger social groups had its own socio-political leader called *temenggung*². In addition, there were a number of other positions within the group. The huts consisted of either lean-to's or small huts with a floor resting on four poles a little above the ground. They lived off hunting and gathering and some exchange of non-timber forest products (rattan, honey and *jernang* or 'dragon's blood' (a dark red resin from the fruits of a particular species of rattan called *Daemonorops Draco Bl.*)) in exchange of products like cloth, tobacco, machetes and iron spear heads. Wild tubers, fish and mollusks, and forest fruits provided most of the food for daily intake. Wild boar, deer, monkeys and numerous smaller animals were the main source of protein apart from fish. Their main hunting weapon was a spear that was not thrown over a large distance but more pushed into the hunted animal. They were not familiar with bow and arrow nor with the blow pipe as many other hunter/gatherers in Southeast Asia. Dogs were important during the hunting expeditions as they helped the hunters to trace the animal and surround it so that the hunter could kill it with his spear. For the daily intake of animal protein fishing was, and still is, extremely important. Fish were caught using various types of nets and traps. Food sharing within and between Orang Rimba groups was and still is common (Sandbukt 1988, Persoon 1994, Wardani 2022).

² The term *temenggung* is an old Malay and Javanese title of nobility. The term has been in use among the Orang Rimba for a long term, and was adopted from their Malay neighbours in the past for their internal leadership structure along with a number of other positions and titles, as well as for the interaction with outsiders. The *temenggung* of a particular group is the person who represents his members in the outside world (Prasetyo 2011).

FIGURE 2 During his explorations in Jambi in 1913, mining engineer Van Waterschoot van der Gracht encountered a 'Wild Kubu tribe' near the village of Air Hitam (© Van Waterschoot van der Gracht with original caption)



Afb. 2. Wilde Koeboe-stam -- Ajer Itam, Djambi.

In the early literature it was not uncommon to differentiate between two types of Orang Rimba or 'Kubu', as they were called at that time. There were supposed to be 'wild Kubu' and 'tame Kubu'. The 'wild Kubu' were the ones who were still leading a traditional and semi-nomadic way of life of hunting and gathering in small bands of only a few families. The 'tame Kubu' were supposed to be on their way to become like the Malay people in the sense of adopting a more sedentary way of life in larger communities and gradually becoming less dependent on hunting and gathering because of their adoption of farming techniques. They did so by imitating the Malay farmers. It was expected that in the end they would be completely absorbed into the Malay community by accepting their religion, their language and style of living (Hagen 1908, Loeb 1974, Marzali 2018).

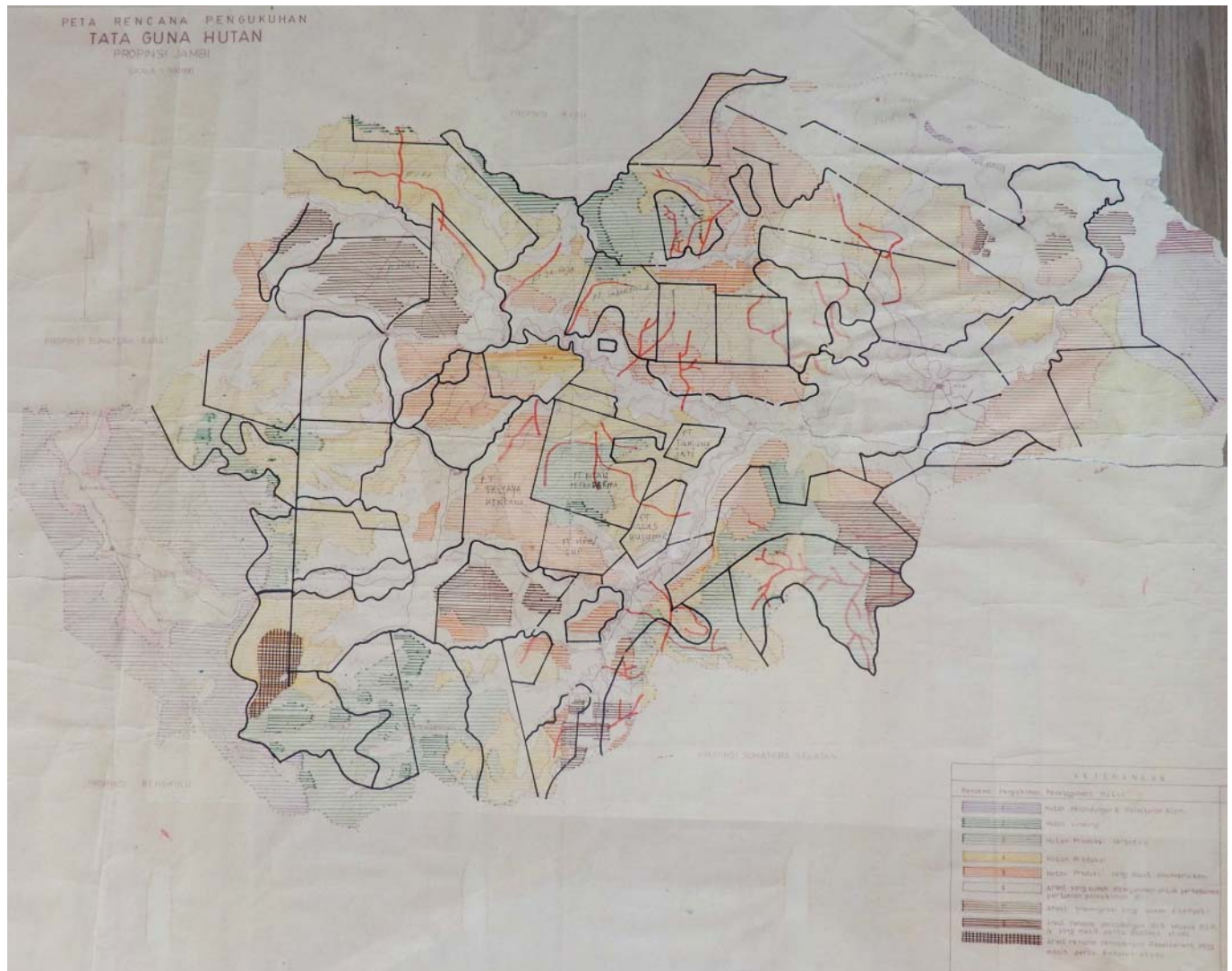
Compared to the interest of colonial administrators and ethnographers in the Orang Rimba in the first decades of the 20th century, because of the 'primitive' nature of their culture and their religion (or even the 'absence' of religious beliefs), relatively little attention was paid to them after Indonesian independence. It was not until the late 1970 or early 1980s

that this interest started to grow again. In the meantime, the Indonesian government had published a number of reports aimed at identifying which groups should be targeted as the ones in urgent need of special development aid. Sometimes the same colonial terminology was used in these governmental reports to differentiate between the 'wild' (*liar*) and the 'tame' (*jinak*) Orang Rimba. This programme for the so-called 'isolated communities' of Indonesia was implemented by the Department of Social Affairs and it was meant to bring these communities into the mainstream of the country's social, cultural and economic life (Departemen Sosial 1973, 1974, 1983).

Intensification of logging

Though logging had been going on since the colonial times and the early years of Indonesian independence, its scale obtained a new magnitude after the New Order regime of former president Suharto was well established (Boomgaard *et al.* 2005). Large scale concessions were granted to logging companies often to be followed by a process of land clearing

MAP 2 Map of land use plan for the province of Jambi in 1984 (Forestry Department). Apart from a small protected area, most of the forested land was planned to be either (limited) production forest or conversion forest, planned to be turned into plantations or transmigration sites. The legend differentiates nine types of land use. See enlarged legend (map 1a)



to make way for plantations or transmigration sites. A forest concession map of the mid 1980s clearly shows, that apart from a small protected area (27,800 ha of the Bukit Duabelas mountain range), the whole central part of Jambi is given out to logging companies. Some parts are classified as production forests, others as conversion forests while a difference is made for conversion towards transmigration sites or plantations. Exempted from the concessions are the areas along the banks of the major rivers where the Malay people have settlements behind which they cultivate various crops including also rubber trees. These logging activities also implied the construction of a rather dense road network in the forest. The logs were usually taken to the main rivers, the Batanghari and the Tembesi, and the logs were floated downstream in enormous rafts to the saw mills near the town of Jambi, before entering the international timber market. Initially logging roads were being constructed but often in a later stage, these roads were up-graded to allow for the passage of not only heavy logging trucks and bulldozers but also smaller vehicles, motor bikes and various forms of public transport to reach the

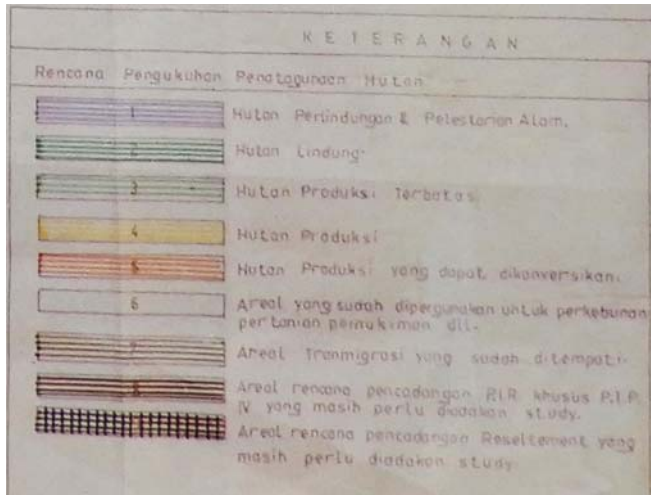
newly developed transmigration settlements. Some of these roads were even paved once the populations densities increased, and the need for transport grew as a result of that.

The arrival of powerful chainsaws, bulldozers, and logging trucks into the territory of the Orang Rimba must have been a shock. The work force of the logging companies showed little understanding for the impact of their activities on the life of the Orang Rimba. The logging activities disturbed the wildlife (in particular wild boar, deer, tapir, and various species of monkeys) which made hunting much more difficult for the forest dwelling communities. Elephants and tigers had already become scarce before that time even though traces of the animals could still be found in the 1980s.

The low population numbers, their scattered temporary settlements and their habit of shying away from confrontations with the outside world, made the Orang Rimba relatively invisible for the people involved in the encroaching logging operations. This way of avoiding encounters or even potential conflicts was even stronger among the Orang Rimba women who always keep a safe distance from outsiders. At a later

MAP 2a Legend 'Forest use plan' (1984)

1. Protected forest and nature reserve
2. Protection forest
3. Limited production forest
4. Production forest
5. Production forest that can be converted
6. Area that is already used for plantation/agriculture by communities
7. Transmigration area that is already occupied
8. Area that is planned for plantation, that still needs to be researched
9. Area reserved for resettlement plans, that still needs to be researched.



stage, after serious complaints by the Orang Rimba or through their *jenang*, some communication between the staff of the logging companies and the Orang Rimba was necessary for instance for the protection of their honey (*sialang*) trees in which bees had constructed their nests. Most of the logging camps actually had hired a local person to deal with the communication with the Orang Rimba. This was usually a Malay person from one of the nearby villages who was familiar with the Orang Rimba communities. In some cases young Orang Rimba men in particular started to hang around near the logging camps in search of cigarettes or something to eat. Some of them were actually hired by the companies to help the chain saw operators or the drivers of the bulldozers to find their way into the forest and to avoid damage to trees that were important for the Orang Rimba but their numbers remained very limited and they were only employed for the lowly paid jobs.

Quite often the Orang Rimba put up their small lean-to's along the logging roads. This allowed them to make use of the roads for the transport of rattan and even to hitch a ride to the logging camp or the weekly market in one of the nearby villages.

In addition, the government itself was charged with the responsibility for facilitating smooth operations in the forests. Part of the procedure was that the forest dwelling communities would be integrated into the official resettlement programme of the Department of Social Affairs. Apart from this programme, some houses in the transmigration projects, mainly aimed at transmigrants from Java or Bali, could also be

FIGURE 3 A bulldozer pulls a hut for workers deeper into the forest. A number of Orang Rimba are hanging around while hoping for some cigarettes or something to eat (Central Jambi, 1985) (© G.A. Persoon)



FIGURE 4 Staff members of the logging company meet a few Orang Rimba along a forest road (Central Jambi, 1985) (© G.A. Persoon)



reserved for the Orang Rimba (Departemen Sosial 1974, 1976, 2004). In general, however, the Orang Rimba did not accept such offers, at least not in the long run. A number of resettlement villages have actually been constructed. In some cases, the Orang Rimba did show up in the initial phase when there were handouts of food, cigarettes, and a number of tools, but very soon they would leave such settlements again and move back to the forest. The prospect of permanently living as a small minority among Javanese and Balinese transmigrants was declined right from the beginning. They would rather stay in the logged-over forest and continue their familiar way of life under changing conditions. There they could hold on to their cultural customs and practices in order to maintain their social identity and keep a safe distance from outsiders (Persoon 1994, Sager 2008).

Originally the area was covered with a dense tropical lowland rainforest with a relatively sparse Malay population concentrated along the banks of the major rivers and living from extensive forms of agriculture and a little bit of fisheries. In addition to growing upland rice for subsistence, the Malay people were also engaged in small rubber plantations as soon as this crop started to become popular in this part of Sumatra which was in the first half of the 20th century (Zendgraaf and Goudoever 1947). The Orang Rimba lived in scattered places in the extensive forests. In the course of history, and usually in the wake of logging operations often followed by conversion processes into a wide range of other types of land use,

waves of official transmigrants as well as so-called spontaneous migrants in search of arable land came to this part of Sumatra. In some sub-districts (*kecamatan*) the population more than doubled between 1980 and 2000 (BPS 2000). Transmigrants occupied officially allocated land while the spontaneous migrants looked for land in logged-over forest, usually close to any kind of road to make sure that their harvests could be taken to the market by small trucks.

Crucial for the development in this area in later years were decisions about the road infrastructure taken in the period before World War II. The colonial government decided that roads needed to be built to connect the relatively small settlements in the area in order to be less dependent on riverine transport. Roads were also being built to connect the isolated Kerinci Valley in the highlands of the Bukit Barisan mountain range with the lowlands, important for the export of vegetables and potatoes. Many years later these roads would play a determining role in deciding on the trajectory of the Trans Sumatra Highway and its connecting road webs. The Trans Sumatra Highway, connecting the most northern tip of Sumatra with the most southern part, had been planned for a long time but its actual construction through the sparsely populated lowland areas of Central Sumatra, would only start in the late 1970 and early 1980s. This happened often in combination with the planning of transmigration sites and the establishment of plantations. This highway, mainly running in north-south direction, had to cross many rivers which mainly

FIGURE 5 The Department of Social Affairs constructed the resettlement village Pulau Kidah near Sarolangun in an effort to persuade the Orang Rimba to adopt a sedentary lifestyle. Some Orang Rimba showed up in the village during initial handouts of food and other gifts. They never occupied the houses in order to actually live there (Pulau Kidah, 1985) (© G.A. Persoon)



ran from the western to the eastern part of Sumatra. Bridges connecting the banks of these wide rivers had to be constructed in order to replace the slow rafts which were used to take cars, buses and people from the river bank on the one side of the river to the other side. Along the roads small settlements started to grow rapidly as trading posts, bus terminals and administrative centres. Thousands of transmigrants were moved from various parts of Java and Bali to the cleared and newly developed sites. Collectively they started to 'domesticate' the wilderness and turn it into a varied landscape with settlements, agricultural fields, and rubber plantations. Many of the people were also employed in the industrial complexes like the plants for processing palm oil and the large saw-mills. In the long run their population numbers increased enormously which called for the construction and growth of improved infrastructure, community facilities and services in terms of education, and health care (Persoon and Cleuren 2002).

The impact of logging operations on the Orang Rimba

It is difficult to attribute the social changes in the life of the Orang Rimba in an area like Jambi specifically to the logging operations alone. In most cases the process of cutting the trees and the extraction of the logs is only a temporary activity which is followed by a whole range of other types of actions which often lead to very diversified types of land use and thereby also offer new challenges and opportunities to the people involved. Therefore, the impact of logging operations

has to be seen over a longer period of time and in the context of the follow-up activities after the initial cutting of the trees. In some cases, if the forest is classified as (limited) production forest, the harvesting of selected trees should be followed by a relatively long period of inactivity in the forest to allow the remaining trees to keep on growing until a second harvest can be planned. This second harvest should not take place before another 20 or 25 years. In the meantime, however, it is common all over Indonesia that illegal logging in these classified 'production forests' further reduces the forest's regrowth (Dudley 2001, Obidzinski 2003, FAO/UNEP 2020).

Encroachment of spontaneous migrants into logged-over forests is also quite common, because for them they are believed to be 'empty lands' (*tanah kosong*), ready for taking. In most cases logging only constitutes the very first step in the conversion process which is followed by clear cutting, which implies the removal of all remaining trees once the commercial ones have been harvested. In the past these remaining trees and vegetation debris used to be burned but as a result of the massive forest fires in 1997/1998 new policies were issued which forbade the use of fire in this form of forest clearing (Glover and Jessup 1997). Bulldozers are used to make big piles of tree trunks, branches, and roots, left to wither gradually, while the forest floor is prepared for the planting of oil palms or rubber trees. This does not mean however that fire is not used anymore as an instrument for clearing the forest floor. Compliance with these policies may be limited as is evident from the yearly occurrence of forest fires in this area.

FIGURE 6 The denuded forest landscape north of the Bukit Duabelas National Park is prepared for industrial crops like rubber and palm oil (2013) (© G.A. Persoon)



Depending on the type of land use that is created after the logging operations, the Orang Rimba are faced with the challenge to survive in the strongly modified landscape. Transmigration sites, including the land holdings of a few hectares for each of the farmers, usually does not offer any opportunity for the Orang Rimba because of its intensive form of land-use by the transmigrants and their families. Rubber and palm oil plantations in particular, however, do have certain characteristics that allow Orang Rimba to hunt for animals. In particular wild pigs (*Sus scrofa*) thrive in productive oil palm plantations by foraging on the fallen fruits, which makes pig hunting quite effective in these plantations. With the expansion of the oil palm plantations this Eurasian wild pig has reduced the territory of the much appreciated bearded pigs (*Sus barbatus*), that used to roam around in the dense lowland forests (Meijaard *et al.* 2005).

In the meantime, the Orang Rimba have not been passively waiting for opportunities that were unlikely to come. In that sense the concept of ‘impact’ which seems to suggest a simple causal relation between a particular cause (logging) and its effects is far more complex in terms of the range of reactions it generates. In this process it also includes the way the people perceive the landscape changes and how they define their options to create another type of future. In the early years of large-scale logging they certainly had an inclination to retreat deeper into the forest. But as the forest became smaller,

they were forced to change that reaction. Gradually many of them have learned that one of best ways to overcome the fate to lose all their traditional resources, was to start agricultural activities themselves, mainly in the form of rubber gardens as this crop has a number of advantages over other types of tree crops. The latex does not easily rot and can be kept for some time before it is sold, when prices are higher. At the same time, by starting small-scale rubber gardens they could claim ownership of the land by means of the investments that they have made.

Overlooking the present situation with regards to the Orang Rimba in the central part of Sumatra it is possible to differentiate between various groups on the basis of their dominant way of life which is often also indicative of the type of settlement in which they live and their relation with the outside world. Elkholy summarizes this variation: “... the great breadth of cultural diversity among the Orang Rimba populations is a direct byproduct of the wider sociopolitical milieu in which these groups have found themselves operating and evolving. As local realities on the ground differ across field sites, so too do those cosmological perceptions that are brought to bear in the problems of existence.” (Elkholy 2016: 193).

In other words, it is possible to sketch the level of intra-cultural variation among the present-day Orang Rimba living in Jambi Province. This differentiation can be understood as

FIGURE 7 Sacks full of damar, collected from tree roots and trunks, are ready to be picked up near Sungai Terab. The damar is the last NTFP resource from the area that was once covered by dense rainforest that could be collected by the Orang Rimba (Sungai Terab, 2013) (© G.A. Persoon)



the long-term result of the impact of logging operations in combination with the cumulative effects of all the activities that were undertaken by a wide range of actors to transform the forest landscape into highly diverse types of land use, and the ways the Orang Rimba have reacted towards these challenges and opportunities. These include the actions undertaken by individuals, agencies and organizations, that have become concerned with the Orang Rimba as a result of the deplorable situation that was created by the logging operations. For these well-intentioned individuals and organizations the situation of the Orang Rimba was not a minor or a side-problem as it was for the logging companies. A number of environmental and Indigenous rights' organizations and also some missionary agencies have started activities to improve the fate of the Orang Rimba that often described them as being the 'victims' or facing misery, sickness and possibly even death. An increase in internal conflicts has also been reported as a result of external interventions, including both the logging operations as well as the well-intentioned type of activities (Prasetijo 2015, 2017 and 2021, Klaver *et al.* 2015, Henschke 2017). Another initiative that should be mentioned in this context was the start of educational activities

through the founding of the 'jungle school' (*sokolah rimba*) for small groups of Orang Rimba children by B. Manurung (WARSI 2014, Manurung 2007 and 2019).

This intra-cultural diversity among the Orang Rimba can be described in terms of a number of types of settlements in relation to their livelihoods.

1. In the central part of Jambi, in the area around the Bukit Duabelas National Park, there are still some groups of Orang Rimba who live in relatively intact forest. This environment enables them to continue to practice hunting and gathering in the way they were used to in the past. Their dwellings are either lean-to's or huts a little elevated from the forest floor. In addition to their hunting and gathering activities for their own subsistence they exchange non-timber forests products with the neighbouring villagers. Or they go to the weekly market to buy the goods they need. Even though the Bukit Duabelas area has the status of a national park the Orang Rimba are allowed to continue to live inside the park by the Forest Department. This decision was already taken more than 20 years ago when the government labelled this area in addition to its national park status as a 'cultural reserve' (*cagar budaya*) for the traditional lifestyle of the Orang Rimba.

2. Some groups have made up their mind and decided that the traditional way of life is either not possible anymore or not the best option for them in the future. They have opted for a change in their livelihood and that is to engage in agricultural activities. The cultivation of rubber trees suits them best. They have established rubber gardens in part of the forest that was already cut by the logging companies but that was not immediately turned into large scale plantations. They themselves have cut the remaining trees after which they planted seedlings of rubber trees on the cleared forest floor. This process has started about 15 or 20 years ago, so these rubber trees have been in full production already for a number of years. With the income generated from the latex they have been able to buy mobile phones, motor bikes and chain saws in addition to food and other products. They have made little investments in their dwelling places. Their settlements still resemble the former types of settlements. Their huts are still relatively simple and the settlements are small and look very much like the traditional Orang Rimba settlements. Their modes of subsistence have changed, however, and the amount of material possessions has increased substantially as a result of this new source of income. In addition to rubber tapping, they are still engaged in hunting, gathering and fishing activities.

3. Some groups survive in the middle of large-scale oil palm plantations. In this area the company PT Sari Aditya Loka (PT. SAL) manages the plantations and processes the fruits in a huge factory. It is a branch of the giant Indonesian plantation company, Astra Agro Lestari Tbk. On a regular basis the headmen of the Orang Rimba receive some money from the plantation companies for the fact that the companies have occupied the traditional territory of the Orang Rimba. As wild pigs do relatively well in the oil palm plantations, the hunting of these animals provides the major source of protein. The wild pigs forage on the fallen or harvested nuts from the oil palms. As such they cause damage to the plantation owners who welcome the hunting activities of the Orang Rimba. The

MAP 3 Land cover map of Bukit Duabelas National Park and its surroundings. Types of land cover a range from moderately dense forest, to low dense forest, mixed agriculture and secondary forest. It also indicates where local communities have their forest fields (perlandangan masyarakat) and which areas are covered by plantations (perkebunan) and transmigration sites (transmigrasi). Logging activities (aktivitas perbalokan) are indicated on the map as well (WARSI, 2002). The map clearly indicates that only a small portion of the Bukit Duabelas National Park is still covered by relatively intact forest

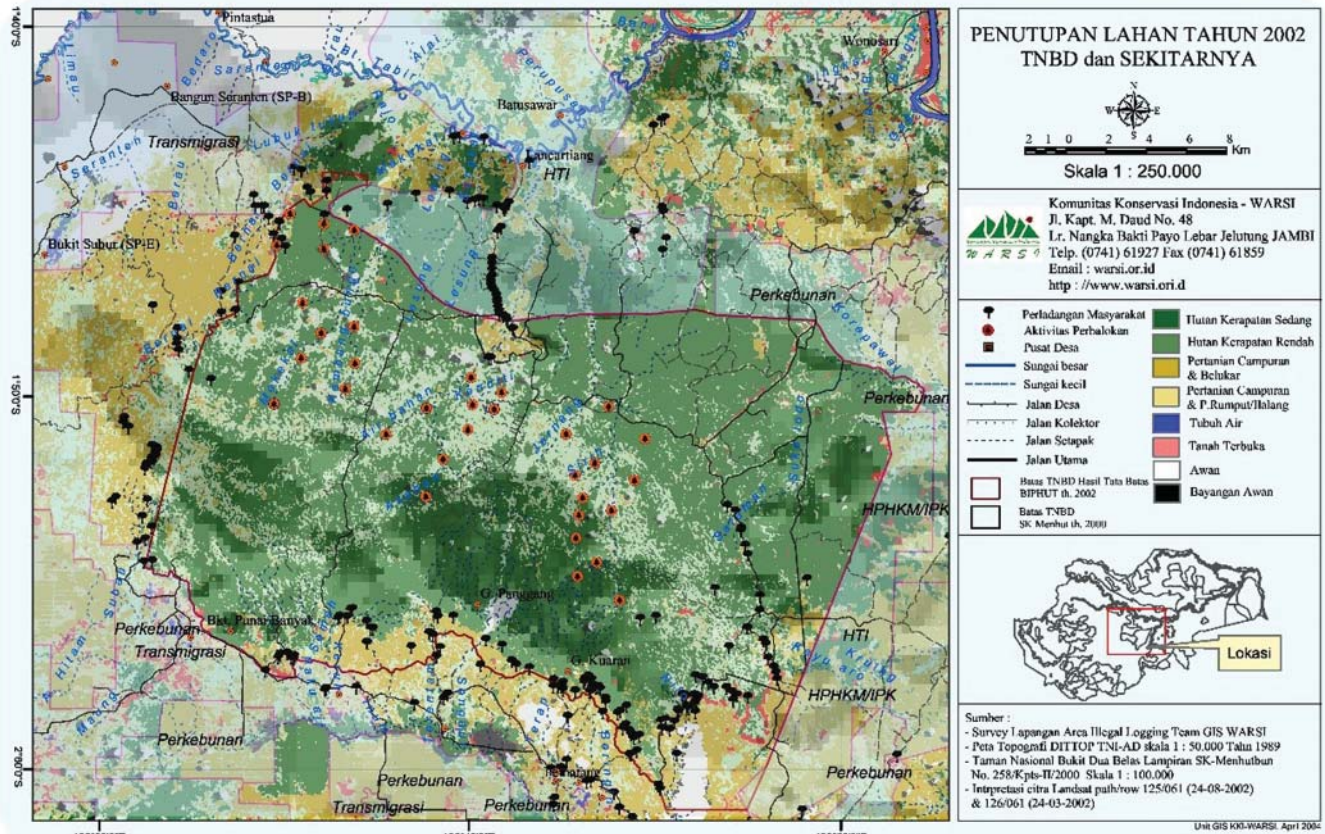


FIGURE 8 An Orang Rimba man takes his possessions from his shelter while moving to a new location inside the Bukit Duabelas National Park. This area has also been designated as a 'cultural park' (cagar budaya) (Bukit Duabelas, 2002) (© G.A. Persoon)



cash income allows the people to buy various kinds of food products from the company stores or from the village markets (Wardani 2022).

4. In the course of many years a large part of the forest near the villages of the Malay people have been converted into a kind of agroforest with rubber gardens and forest gardens with a large variety of fruit trees such as durian, jackfruit, rambutan and banana's. The zones with these extensive mixed gardens are also attractive for wildlife. Wild pigs, deer, monkeys, birds and all kinds of rodents find their way to these gardens where they are considered a pest. As the consumption of many of these animals is forbidden for the Malay people, all of whom adhere Islam, the Orang Rimba are welcome to hunt these animals in order to reduce the damage done to the crops. This form of 'garden hunting' is beneficial to both the Orang Rimba as well as the Malay people and that is one of the reasons why the Malay people do not mind if some Orang Rimba people settle in the agroforestry zone of the forest.³

³ The term 'garden hunting' was introduced by Linares in an article published in 1976, using archaeological field data from a number of South and Central American sites. In this article the author compares animal biomass under natural and under gardening conditions, in particular shifting cultivation practices with roots crops. It turns out that quite a number of animals do quite well under such gardening conditions, which makes 'garden hunting' also quite effective (Linares 1976).

FIGURE 9 A woman cutting the bark of a rubber tree to tap the latex in Tanah Garo. The cultivation of rubber allows the Orang Rimba to claim land and to earn a cash income because traditional forest resources are no longer available (Tanah Garo, 2013) (© G.A. Persoon)



5. As a result of missionary activities by Christian churches such as the HKBP (Huria Kristen Batak Protestan or the Batak Christian Protestant Church) and the GKPI (Gereja Kristen Protestan Indonesia or the Indonesian Christian Protestant Church) a small number of Christian Orang Rimba enclaves have been formed in a predominantly Muslim Malay environment. These small enclaves are maintained through the input of aid products and the attention that is given to the converts by the Protestant churches mainly from North Sumatra, which in their turn are often supported, financially and otherwise, again by international missionary organisations. In many ways these Orang Rimba have adapted to a more modern lifestyle in the sense of becoming less dependent on hunting and gathering and relying more on agricultural activities but at the same time they are not fully integrated into the Malay society because of their different religion. A social distance with the Malay villages is maintained.

6. The conversion process to Islam is different. Adherence of this religion brings the Orang Rimba closer to their Malay neighbours. In the context of the resettlement programme and other forms of governmental interference, Islamic missionary

FIGURE 10 A woman with her children along a road in an oil palm plantation in Sungai Terap, north of the national park. Surviving in such an area requires enormous adaptations for the Orang Rimba (Sungai Terap, 2013) (© G.A. Persoon)



FIGURE 11 Boys returning from a visit to the market in the Malay village Jernih along the Air Hitam river. A motorbike, bought with money earned from selling rubber latex, is a useful means of transport to travel in the area (Jernih, 2013) (© G.A. Persoon)



activities have been undertaken among the Orang Rimba. Because of the predominantly Islamic population in Jambi, promotion of this religion is almost implicit in all kinds of governmental policies and activities. One of the Orang Rimba leaders, *temenggung* Tarib, who has officially been invited to Jakarta a couple of times to be awarded prizes, converted to Islam a number of years ago. It was hoped that by having a role model, his fellow Orang Rimba would follow soon.

This did not happen at a large scale, but recently the Islamic missionary activities (*dakwah*) have intensified and they have become more aggressive.⁴ In a recent article of one of the country's leading newspapers it was argued that the conversion was the last option for some of the Orang Rimba as their homelands were completely devastated. By becoming Muslims they would receive more government attention and it would be easier for them to integrate into the mainstream Indonesian society (Jakarta Post 2017). Though it is claimed that this conversion implies a decisive step to leave behind their familiar lifestyle, it is hard to imagine that this is actually the case. Adaption to a new lifestyle, including getting used to houses, to new types of food, while swearing off others, and to ways of living in close interaction with the Malay people, requires a transition that cannot actually happen overnight (Henschke 2017, Manurung 2019). Moreover, the prejudices of the Malay people towards the Orang Rimba do not easily fade away.

7. A small number of people make a living along the highway and on bus terminals and gasoline stations by either begging or selling forest products and medicinal plants. These people have either lost access to their forest land or they have experienced that this modified way of 'hunting and gathering' turns out to be successful at least to some extent. Orang Rimba beggars sometimes featured in the Indonesian press as the ultimate result of forest loss and lack of alternatives. At the large bus terminals along the Trans Sumatra Highway with some big restaurants serving Indonesian style 'fast food'⁵, collecting some food or money is apparently an option for some Orang Rimba. They may hang around these locations during part of the day before returning to their huts inside the degraded forest or in the plantation areas.

This variation in types of livelihoods and settlement in relation to their livelihoods or way of life of the Orang Rimba should not be taken to be very rigid or permanent in nature. It is possible for people to change or move away from one group or merge with relatives in another group. Or members of a particular group may combine two or more of these types of livelihoods. The overview's main purpose is to show the diversity of the ways that the Orang Rimba make a living in this strongly modified environmental and social landscape in central Sumatra.

A special note should be made of the position of women in these changing situations. As stated before, in the past women were protected from outsiders. The women were kept away from interaction with strangers and men who were not close relatives. Trade relations and contacts with government

FIGURE 12 Selling medicinal plants and/or begging for money on a bus terminal along the Trans Sumatra Highway (Bangko, 2002) (© G.A. Persoon)



officials were exclusively done by the Orang Rimba men. The same would apply for contacts with representatives of NGOs, journalists or researchers, and workers of logging or palm oil companies.

To a large extent this level of shyness still prevails and many of the traditional taboos are still applied. But, because of the higher population density in the area, the increased number of settlements, the housing complexes for the work force of logging and other companies, the chance of meeting 'strangers' has also increased. In some areas Orang Rimba women actually visit weekly markets in the Malay villages along the Air Hitam river. When they do so they will always be accompanied by other family members. The room to move for them beyond a relatively small area is still limited (see also Elkholy 2001).

In spite of the increased interaction with various groups of outsiders, it is noteworthy that one type of outsider has not yet 'discovered' the Orang Rimba, and that is the tourist looking for exotic Indigenous people. Many Indigenous communities in Indonesia have recently experienced the rise of 'cultural tourism' aimed at colourful ethnic communities, like the Baduy, the Mentawaians, the Ngaju Dayak, the Toraja and many others. It is also unlikely that the Orang Rimba would welcome this kind of outside interest. In addition, there is no infrastructure for 'jungle tracking' and the absence of visually photogenic rituals or cultural objects explains this lack of interest of this group of outsiders.

⁴ Various Islamic organisations in Indonesia have quite aggressive missionary practices among the country's Indigenous peoples, such as the Orang Rimba, as well as among adherents of other religions (see for instance Henschke 2017 and Suryani 2021). One of these organisations, *Front Pembela Islam* (or Islamic Defenders Front) has officially been banned by the government in December 2020 because of their violent practices and threats of the public order. This and other Islamic missionary organizations are strongly opposed some recently issued regulations of the Indonesian government which allow for a more tolerant attitude towards the country's 'Indigenous religions' (*agama asli*) (Suryani 2021).

⁵ In *Rumah Makan Padang* restaurants food with many kinds of meat, fish and vegetables is put on the table as soon as guests arrive. Most dishes are cold but the served rice is always hot. The guests only pay for the food from dishes they have actually used. The rest is brought back to the kitchen. These kinds of restaurants which are based on the cuisine of the Minangkabau, the dominant people of West Sumatra (of which Padang is the provincial capital).

DISCUSSION AND CONCLUSION

It is clear from historical accounts that the Orang Rimba have a long tradition of adaptation to changing conditions. They have reacted towards challenges and opportunities that were created by the interaction with outsiders. In the past they have more intensively become involved in exchange relations and they have adopted material objects, like ironware, including the shotgun (*kecepek*), cloths, plastic containers and plastic sheets for roofing purposes, and all kinds of new food stuffs (canned fish, sugar etc.). In that sense their culture has not been 'static'. But there can be no doubt that the scope of the challenges and opportunities has dramatically increased in the past few decades. A diachronic perspective over a longer period of time can modify the impression of the initial state of affairs. The main message of the first substantial reports about the Orang Rimba after the start of the massive scale of logging operations in the 1970s, was one that was similar with that of forest dwelling communities in other countries. They were mainly pictured as 'victims' of forest destruction and in many cases words like 'deculturation', 'tribal extinction' were often used to describe their inevitable fate. Their projected futures were very bleak. A diachronic perspective over a number of decades however has highlighted that, in spite of the continuation and even intensification of the logging operations and including the rigorous transformation of the landscape, the Orang Rimba have proved to be much more resilient than initially expected. The same conclusion has also been drawn for other forest-dwelling communities in similar conditions (Bahuchet *et al.* 2001, Minter 2010, Endicott 2016). They turned out to be resilient in coping with the challenges imposed upon them by the changing conditions. Though they could certainly be described as victims of the dramatic degradation of the forests, they simply had to cope with the changing situation. Being 'victims' is only one aspect of their position, referring in particular to the early phase of the operations.

One striking aspect of the distribution of the Orang Rimba in the central part of Sumatra and comparing it with a number of decades ago (or even longer), is the relatively high degree of permanency of the locations where the Orang Rimba live or move around. From one perspective one would have expected a retreat of Orang Rimba towards relatively intact forest or into protected areas like the Bukit Duabelas (Jambi) and the Bukit Tiga Puluh (Riau) national parks. However, this has not happened. To a large extent the groups of Orang Rimba that were described in the 1970s or earlier as groups living within particular watersheds of the rivers like Air Hitam, Kejasung and Mengkakal are still to be found within those areas (compare Departemen Sosial 1974, Wardani 2022, and various maps published by WARSI). This is remarkable because the landscapes have in most cases been dramatically modified by processes of conversion (establishment of plantations, large palm oil processing plants, or transmigration sites). And yet, in most cases the Air Hitam, Kejasung, Mengkakal and other groups are still to be found in their original home areas, living a radically changed life. This raises the question, following Vayda and Walters' suggestion,

why the Orang Rimba did not flee towards the remaining forest patches and merge with other groups who were still living in relatively intact forests.

It is difficult to provide an answer to this question but part of the explanation may be related to the strong coherence of the individual groups based on close kinship relations. Each group has its own territory within a particular watershed. This fact apparently does not facilitate the easy fusion of the groups across these traditional boundaries in spite of the changing resources available which force them to radically modify their mode of living. Another reason is the strong attachment to the land itself and the way access to the land and its resources is defined within and between the groups. The mobility of the Orang Rimba is smaller than what one would expect from hunter-gatherers who were always described as being 'nomadic'. It appears that the room to move has clear boundaries that still largely overlaps with traditional watershed territories. It would be interesting to compare whether other groups of (former) hunter-gatherers, such as the Batek in peninsular Malaysia, the Penan in Borneo or the Agta in the Philippines, under similar circumstances show the same kind of persistency in holding on to the traditional boundaries of their territories or whether they are more inclined to merge with other groups living in better conditions, and be accepted by them (see for instance Minter, 2010, and Lye Tuck-Po 2018).

It has been about fifty years since large scale logging operations started to take off in the lowland rainforests in the central part of Sumatra. Compared to the logging and to a smaller extent also mining activities which started in colonial times and the early decades of Indonesian independence, the scale of the activities has intensified enormously. The logging operations were followed by a whole range of other interventions that made use of the opening of the forests through the logging roads and the infrastructure that was slowly developed. Areas designated as conversion areas in the national and provincial spatial planning were converted into plantations for industrial crops or into transmigration sites. The influx of the workforce, the arrival of tens of thousands of transmigrants and spontaneous migrants looking for arable land in the logged-over forests has led to a rapid increase in the population. The Orang Rimba, as the traditional inhabitants of the area, had to cope with the changing landscape and the increased interaction with the newcomers. In addition to the impact of all the activities that were primarily focused on the natural resources, the Orang Rimba themselves also became a target population of various governmental agencies and missionary groups in an effort to bring 'civilization and development' to them. The combined direct and indirect impact of all these interventions has generated a diversity of changes in the lifestyles of the Orang Rimba. Groups of Orang Rimba have reacted towards these changes in various ways which explain the diversity of lifestyles. Specific environmental conditions and individual choices of Orang Rimba men and women have contributed to this diversity. As a reaction, the people developed coping strategies, applying their traditional skills and knowledge but also their creativity in finding new ways to deal with the challenges and hardships imposed upon them. In this way they were able to overcome

the fate of just becoming the victims of the interventions, and redefine their identity as Orang Rimba. To a considerable extent these reactions and strategies were also shaped and influenced by activist researchers and members of NGOs (Manurung 2007, Sulistiya *et al.* 2007, Suryani 2021 and Arizona 2022), who were often inspired by the international discourse on the rights of Indigenous peoples. Slowly, the fruits of this discourse also trickled down in Indonesia not only through a number of governmental decisions and adaptations of policies in terms of cultural and religious rights but also in terms of land right policies which are slowly being implemented. Use of public media, nominations for national environmental awards and other types of support for the Orang Rimba, leading to a higher level of resilience, were undoubtedly generated on the basis of initiatives by these outsiders.

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