# The social impact of FSC

## An exploration of monetisation models for the social impact in the tropical forest sector

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# Summary

Certified timber has additional value over regular (non-certified or illegally harvested) timber. By emphasising the added value of certification scheme, Sustainable Forest Management can be promoted. This research relates to the scientific discussion of internalising externalities, by exploring different (monetisation) models for social impact assessment of the forestry sector and in particular the FSC certification scheme. When the social impact of FSC social timber can be measured and communicated to the consumer, the market share of certified timber can be increased. This can be done, for example, through the FSC Social Impact Calculator.

Through literature study the different possibilities for monetisation models were explored. Monetisation has as advantage that results are expressed in monetary value which is instinctively understood by the consumers. It can be concluded that, at present, the current models that are available do not suffice for social impact calculations in the forestry sector.

Furthermore, the data availability of social data in the forestry sector was explored. Audit reports were shown to be the only data source available and relevant for social impact assessment. Therefore, a big data gap emerged, relevant for further research.

A model to indirectly measure social impact is the Corrective Action Request-analysis (CAR-analysis). This model is based on the data from audit reports. In this data, CARs show the noncompliance of certifications to the standard set by the certification scheme. For FSC, their standard is illustrated in the 'Principles and Criteria'. This document proved central in this research, making social impact measurable in indicators. Subsequently, the CAR-data that was extracted from the audit reports for this research was analysed. This analysis showed that especially on worker's health and safety, the FSC certification do not comply to the standard.

**Key words**: Social impact assessment, monetisation, certification, FSC, audit, internalising externalities

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# List of abbreviations

CAR     Corrective Action Request

DALY    Disability-Adjusted Life Year

ESCU    Eco Social Cost Unit

FMU     Forest Management Unit

FSC     Forest Stewardship Council

LCA     Life Cycle Assessment

LCC     Life Cycle Costing

NRA     National Risk Assessments

SFM     Sustainable Forest Management

S-LCA   Social Life Cycle Assessment

ToC     Theory of Change

# List of figures and tables

# Introduction

## Global challenges and the Global South

Facing distressing climate, human and ecological challenges like global warming, worldwide poverty and ecosystem losses, the world is at a crossroad of human history. Even though these issues are complex, the world as a community needs to find ways to address these problems. During the meeting of the world leaders in 2015 to sign the Sustainable Development Goals of the United Nations, a plan of action to address the challenges was formulated. All participating members agreed on 17 goals to be accomplished urgently as one global community (UNDP, 2015).

One might argue that climate change is the biggest and most impactful challenge of them all. Climate change is phenomenon that threatens millions of lives today and future generations. While addressing the issue of climate change is a concern for the entire global community, the world's poorest are the most vulnerable to the risks that climate change brings. In its current state, climate change already has negative implications for millions of poor people all around the world, most especially in developing countries (Desai & Potter, 2014, pp. 341–345). In Paris, 2015, world leaders agreed on limiting global warming to 1.5 to 2 degrees Celsius (UNFCCC, 2016).

It is expected that climate change will exacerbate existing and anticipated problems that are interlinked to one another such as; conflict over natural resources, ecological degradation and social inequality (Desai & Potter, 2014, pp. 341–345). One example of complications that climate change is bringing is the increased stress on food security, due to the change in rainfall patterns. This is a major concern of the Global South. It is expected that this would lead to more famine and accelerated spread of parasites and diseases due to degrading quality of water and changing climates (Desai & Potter, 2014, pp. 341–345). To that end, climate change poses a wicked problem for the global community as a whole (Rockström et al., 2009) and most particularly for the poor. Factor in the growing world population and its increased use of natural resources, especially when incomes start to rise, and one can see that the pressure on natural resources becomes high: an issue in need of addressing (de Vries, 2013).

## In relation to forests

In the late 1980's, forest degradation and deforestation became serious concerns for the global community (Cerutti et al., 2014). SDG 15 is assigned in part to this issue: life on land. Moreover, making sure forest degradation and deforestation stops contributes to and is essential in our efforts of mitigating climate change. Forests can thus play a key role in mitigating climate change and increase the adaptive capacity of forests communities.

While climate change poses a problem that cannot solely be addressed by halting deforestation, putting in more effort to do so will reap multiple benefits. Forests absorb $CO_2$ and sequestrate this in biomass. Canadell, Raupach (2008) and Bonan (2008) state that halting deforestation is a cost-effective contribution to climate protection while Malhi et al. (2008) also stress that halting deforestation can create a positive feedback of mitigating climate change. Furthermore, an important service that forests bring to communities is their role in increasing the resilience and adaptive capacity to natural disaster for communities living nearby (Desai & Potter, 2014, pp. 329–332; Pramova, Locatelli, Djoudi, & Somorin, 2012; Seppälä, Buck, & Katila, 2009). The FAO (2018) affirms that 1.6 billion people rely on forest resources for their livelihoods. Furthermore, forests contribute to national development, reducing poverty and enhancing food security.

Currently, the world consumes up to 4 billion $m_3$ of wood-based products, which is projected to double by 2030 (Breukink, Levin, & Mo, 2015). More than half of this production comes from developing countries (Breukink et al., 2015) emphasising the importance and potential of this sector for international development. Not only is this growing market an opportunity, it is also a threat for the forests: in the last couple of decades large parts of wood production forests have been lost (Breukink et al., 2015).

## A role for certification

The United Nations Conference on Environment and Development in 1992 in Rio de Janeiro promoted forest certification as most important means to tackle the problems of forest degradation and deforestation (Cerutti et al., 2014). More than two decades later, climate change urgently creates the need to explore efficient forest management systems (Desai & Potter, 2014, pp. 329–332). Mitigating carbon emission through forestry can be done in two ways according to Canadell and Raupach (2008): expanding the use of forest products so as to capture more carbon and replace $CO_2$-intensive products and reduce emission from deforestation and degradation. Increasing the use of certified wood enables Sustainable Forest Management (SFM), which is proven to be a cost-effective way to manage forest and tackle deforestation (Canadell & Raupach, 2008). Certification addresses the two ways forestry can mitigate carbon emission.

Research has shown that Forest Stewardship Council (FSC), as a certified SFM practice, creates a positive social impact for the surrounding community and help them develop (Ackerknecht, Bassaber, Reyes, & Miranda, 2005; Cerutti et al., 2014; Karmann & Smith, 2009). For example, implementing FSC can result in better and safer working conditions (Ackerknecht et al., 2005). Cerutti et al. (2014, p. 37) state that "certification is an incentive to companies to raise their standards". Thus promoting the use of certified wood and increase the demand to grow the sector forms an ecological, social and financial opportunity that affects some of the 1.6 billion people depending on forests and forest resources worldwide (FAO, 2018). In this thesis, the possibilities of showing the social value of certified wood will be explored in order to grow this demand.

This thesis will centre around the social impact of FSC tropical timber and will follow the subsequent line of reasoning. Through a theoretical understanding of the way which private governance schemes like FSC can contribute to halting deforestation, the effectiveness of certification will be discussed. It will be argued that if the effectiveness of FSC goes up, so does the area of Sustainable Forest Management. In order to raise effectiveness, consumer awareness needs to be increased. This can be done by internalising externalities: by showing the additional of certified timber the willingness for consumers to buy such products can go up.

The research objective is to explore monetisation models for social impact that could assess the social impact that FSC timber has. By evaluating which indicators are necessary for such a model and mapping the data available to do so, the different (monetisation) models can be evaluated. This research closes with a social impact assessment using the limited data currently available.

# Theoretical Framework

## Private Governance

### Private standards as governance mechanism in globalising politics

Private governance can broadly be defined as "a form of socio-political steering in which private actors are directly involved in regulating—in the form of standards or more general normative guidance—the behaviour of a distinct group of stakeholders" (Pattberg, 2006, p. 591). With private governance, the actors can be firms and civil society organizations that have little direct involvement from governments.

State actors were long considered as the only actors having power in global governance (Fuchs, 2005). However, in recent years, there has been a clear shift in power balance. Partly due to a globalising world and transboundary problems, state governance now shares this power and responsibility with non-state and private governance which have become increasingly more important (Abbott & Snidal, 2008; Fuchs, 2005; Pattberg, 2005). Global politics is becoming more and more privatized (Pattberg, 2005).

With neoliberalism the state re-regulated their governance spheres enabling more space for the markets. Private actors could now assume responsibilities within state-sanctioned frameworks (Bevir, 2011; Bevir, Rhodes, & Weller, 2003). With more wicked and complex global problems, it is not surprising that private governance is taking the centre stage in the global governance arena. Private governance works very differently from public governance: the rules of private governance exist outside the political system as we know it (Pattberg, 2005).

Non-state governance is particularly present in the field of sustainable development governance because of the multidimensional and transboundary nature of the problems (Bäckstrand, Kuyper, Linnér, & Lövbrand, 2017). Nowadays non-state governance is "facilitating an institutionalised solution to complex environmental and social problems" (Pattberg, 2005, p. 182).

Private governance has changed from influencing international policy to implementing and monitoring regulation (Abbott & Snidal, 2008; Pattberg, 2005). Therefore, private governance enabled the development of standards in various sectors. In this way certification, which is a specific form of private governance, functions as a global governance tool (Marx & Cuypers, 2010). Especially third-party certification, the system FSC uses, is considered a form of independent non-state market regulation (Cashore, 2002).

### Private governance of forests by FSC

The protection of forests is a classic example of a global transboundary environmental problem which is increasingly taken up by non-state actors (Marx & Cuypers, 2010). Corruption and dysfunctional enforcement mechanisms are often named as key causes for illegal logging and deforestation (Marx & Cuypers, 2010). The creation of forest certification tried to tackle this problem: their intention is to promote good governance contributing to SFM and consequently develop governance institutions in the region they operate (Bell & Hindmoor, 2012). Cashore, Auld and Newsom (2004, p. 4) called the creation of certification "one of the most innovative and startling institutional designs of the past 50 years".

FSC can be classified as private multi-stakeholder initiative that has a rule-making role in global environmental politics (Bell & Hindmoor, 2012; Pattberg, 2005). Because FSC operates on a global scale and it is performance based, it is generally considered the most effective forest certification scheme (Marx & Cuypers, 2010).

## Effectiveness of private governance

Private standards are based on strong requirements and are characterized by third-party auditing. It is the most stringent form of private governance (Kalfagianni & Pattberg, 2011). FSC is a private governance mechanism with an emphasis on inclusiveness, having an environmental, social and economic chamber represented by multiple stakeholders. This leads to higher and stronger requirements or stringency (Kalfagianni & Pattberg, 2013b).

Private standards as governance mechanisms have two characteristics. Firstly, they are prescriptive requirements for the private sector that rely on sanction mechanisms, third-party auditing and certification. Second and most importantly, they rely on public consciousness and market forces in order to generate the intended sustainable impact and in order to exert pressure on their target group (Kalfagianni & Pattberg, 2011).

Whether a private standard is effective, is assessed in terms of its output, outcome and impact. Kalfagianni and Pattberg (2013a, p. 125) define effectiveness as "the level of success of institutional performance towards some objective that motivated its establishment", whereas institutional performance refers to the private standard. Output is the characteristics of the standard, such as the stringency and audit quality (Biermann & Gupta, 2011). Outcome refers to the uptake and shows whether there is a positive change in behaviour of the actors involved: whether the rules/standards are adopted and complied by the intended target group and whether the consumers recognize and buy the products (sales). The impact is the measurable effect as a result of the standard, in economic, social and environmental terms (Kalfagianni & Pattberg, 2011; Rosendal & Andresen, 2011).

In this effectiveness lies an innate trade-off: the higher the stringency (output) of a private standard, the lower the uptake (outcome), while a low stringency leads to a higher uptake. The innate problem with this is that it always results in a low effectiveness for certification (Kalfagianni & Pattberg, 2013b). Furthermore, FSC is "limited to the existence of sensitive markets and access to these markets" (Marx & Cuypers, 2010, p. 427). FSC already has a high stringency, thus, it is limited in its uptake.

Consequently, following this reasoning, the impact and effectiveness of FSC certification is by definition low. Its high stringency is characteristic for this certification and is one of the main reasons the certification is considered to be one of the best in the forestry sector. So, in order to increase the effectiveness of this private standard, the uptake or the sale need to be higher. In the following paragraphs, an argument will be given on why monetising the social impact externality can help as method to do so.

## Internalising externalities

### Defining externalities

Certified wood brings to the table extra value due to the promise of SFM and social equity. In a usual transaction between buyer and seller, the price is a true reflection of the product's worth. When externalities are involved, this reflection becomes distorted (Dascalu, Caraiani, Iuliana Lungu, Colceag, & Raluca Guse, 2010).

UNEP (2009, p. 16) gives a concise explanation of what an externality entails: "An externality occurs when a decision within the value chain imposes costs or benefits on others which are not reflected in the prices charged for the goods and services". This means that there are aspects that the buyer is not charged for, which are left to the (global) community to indirectly pay for. This creates a price distortion and leads consumers to be unaware of the real value of the product. To address this problem internalisation of externalities is creating a solution (Dascalu et al., 2010).

## How internalising externalities can stop deforestation

Marx and Cuypers (2010) used FAO data to show that 2% of the roundwood production in developing countries is for industrial export. On top of that, deforestation mostly happens in developing countries (Chakravarty, Gosh, Suresh, Dey, & Shukla, 2012). Furthermore, the most important cause for deforestation is not illegal logging for industrial export, it is large-scale agriculture. It seems like only forests that have a production function are targeted by certification, thereby not tackling deforestation in general (Marx & Cuypers, 2010). Therefore, the question arises if certification is the most effective tool to halt deforestation.

Because FSC certification addresses the issue of deforestation through a commercialised approach Marx and Cuypers (2010) argue that the deforestation from agriculture cannot be addressed by certification. This is to say, not until it is shown that a forest contains enough value (that can be marketed) and in that way provide incentives for certification. This is where internalising externalities can play a crucial role.

Internalising externalities thus has two advantages. It can stimulate the increase of forest owners that are willing to take up certification and make consumers aware of the real price of FSC wood. Bray, Johns and Kilburn (2011) show that consumers are inclined to buy more ethical products over 'regular' products if, among others, the information provision about that product would increase and consumers would know the benefit of buying that product over another. Therefore, internalising externalities should (eventually) lead to an increase in sale.

# Theoretical framework

This theoretical framework, as shown in Figure 1, summarizes the theoretical line of reasoning described in this chapter.
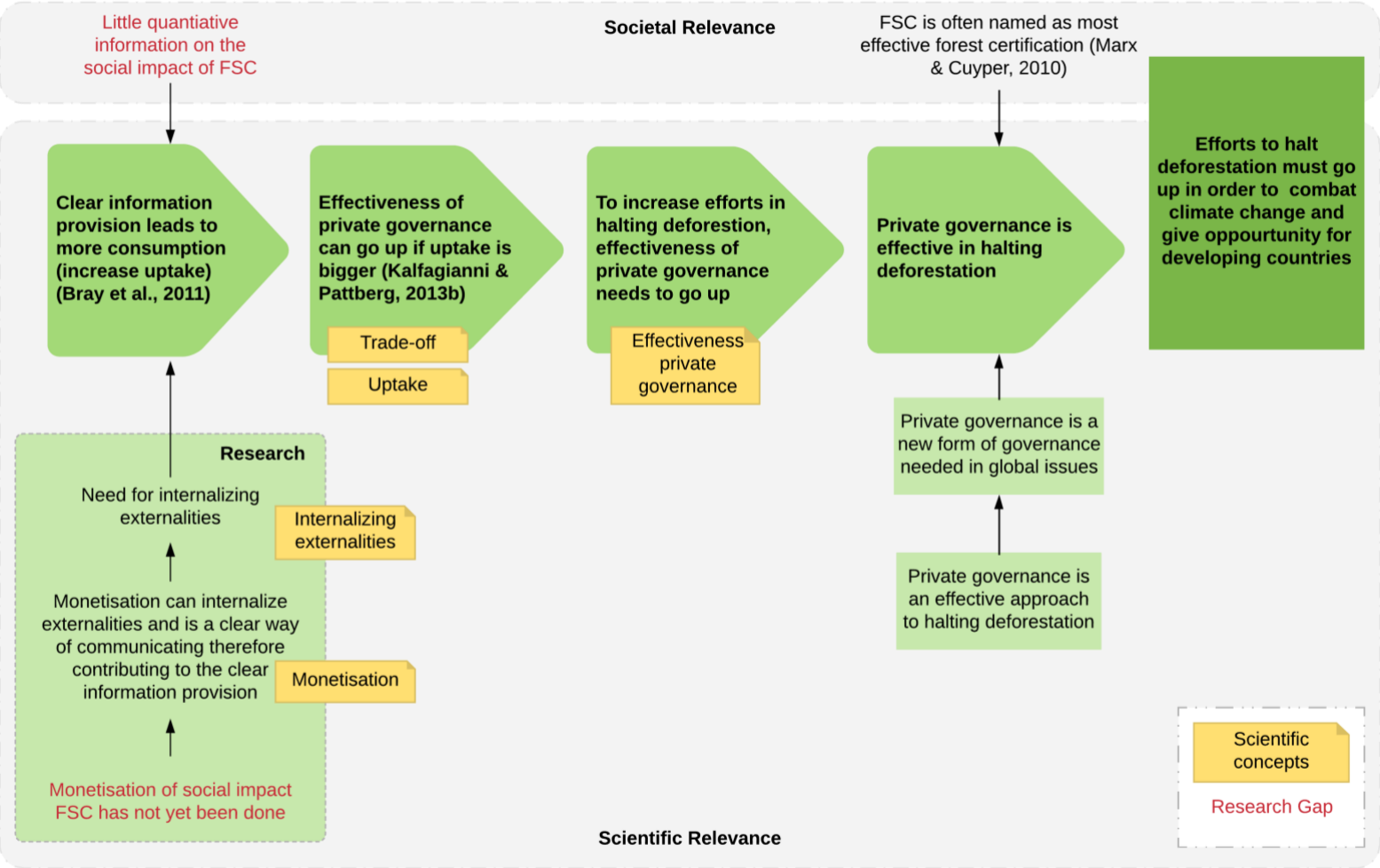


Figure 1 Theoretical Framework (author's own)

# Research design

In this chapter, the research objectives and research questions will be discussed. The general methodological and analytical steps followed to answer the research questions are addressed in the present chapter, additional detail will be provided in the results of the sub-questions. The following topics will be considered: information sources, data collection, measurement, quantitative analysis, and reliability and validity.

## Research objective and questions

This thesis project presents exploratory research which was in part commissioned by FSC Netherlands. They requested to explore the possibilities of complementing their existing Impact Calculator for tropical timber (http://impacttool.fsc.nl/). The focus is on the social impact of the FSC certification scheme in countries where tropical timber is harvested. For the impact calculator, in the end, the idea is to monetise the social impact of FSC. This allows the buyer to assess how social externalities of FSC-certified tropical wood are internalised in their price. The expected outcomes are twofold. First, by providing this information, consumers can make more deliberate decisions on which type of wood to buy to have the biggest positive (social) impact. Second, doing so makes the social impact of FSC explicit.

To explore whether monetisation models for social impact are possible for the forestry sector and in specific for the FSC certification scheme, the following research question and sub-questions will be addressed:

| RQ | What data and indicators are required to construct a model for monetising social impact of FSC tropical timber? |
|----|----|
| SQ1 | How is social impact defined and what indicators are used by FSC to measure it? |
| SQ2 | What (monetary) models exist to calculate social impact? |
| SQ3 | What data are available to use for tropical timber social impact calculations and what data are missing? |
| SQ4 | What is the social impact of FSC-certified tropical timber based on the results of the data-analysis? |

Table 1 Research question and sub-questions

*SQ 1*

The first sub-question guides the first phase of this research. The purpose is to map the social context of the tropical timber sector and to better contextualise the timber sector and tropical forestry for this research. This implies an analysis of the social impact in the timber industry, with particular attention for the FSC forests.

*SQ 2*

Subsequently, an account of the different monetisation methods is made. There are already several monetisation models available in the scientific community; this sub-question provides an overview. Once the different methods are known, one can carefully consider the most appropriate method for the research objective.

*SQ 3*

The third sub-question explores what data are already available for social impact calculations in the forestry sector. Once this overview is completed, the data gap can be determined. Knowing which data are missing provides a part of the answer to the research question.

*SQ 4*

Under the fourth sub-question, Corrective Action Request (CAR) data are analysed to assess the extent to which FSC complies to the social impact it intends to have through their FSC standard.

The overall structure of this research is presented in Figure 2.
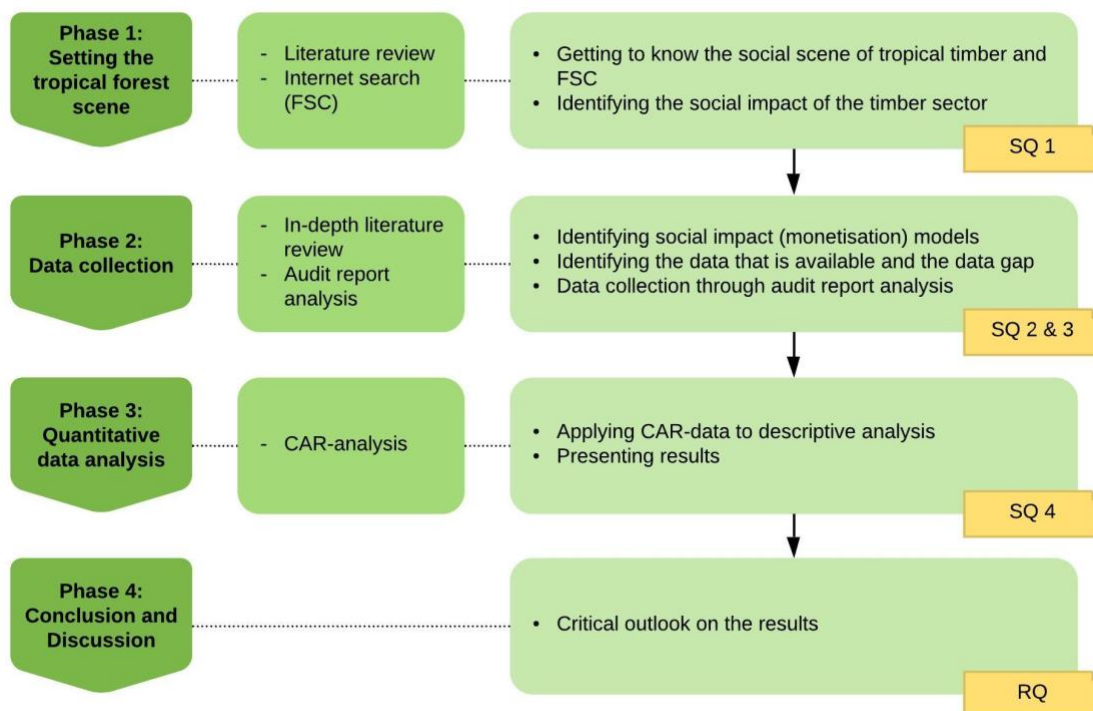


Figure 2 The research Framework

## Methodology

This research combines a literature study (for sub-question 1 till 3) and a quantitative analysis of CARs (sub-question 4). The literature study is in part a continuation of searching for monetisation models

of social impact by Croes and Vermeulen (2016), and Velden and Vogtländer (2017) as well as a CAR analysis as done by Peña-Claros, Blommerde, and Bongers (2009). The main methodological approaches are described in this chapter; some of the sub-question specific methods are worked out more in detail in the results chapter.

## Information sources

### Literature

The literature study was based on academic papers and other relevant information that could be retrieved through the internet. Four strategies were used to find records. First, a combination of the following search terms, among others, was used in scholarly search engines (e.g. Google Scholar): "social impact", "forestry", "certification", "monetisation", "SLCA", and "impact measurement". Second, the reference lists of core papers were examined (snowballing technique) to identify additional literature. Third, experts in the field suggested additional papers. Fourth, the website of FSC was consulted for other relevant (non-academic) information regarding the context of FSC and its social impact.

The selection of the appropriate literature was guided by the research question and its sub-questions. The search and selection process were not established *a priori* (not a systematic literature review), and the collection of relevant literature continued throughout the research. During search and selection, the focus was on studies in countries where tropical wood grows, in order to fit the context of this research. Recent literature received preference, especially concerning the third sub-question on social impact models, all within the timeframe 2002-2020.

### Audit reports

Specifically for the fourth sub-question, the information source consists of audit reports. An explanation and justification of analyses based on audit reports will follow. The reports are publicly available on the FSC website (https://info.fsc.org). Further details are described in the result section of sub-question 2.

The audit reports were selected based on the country of the certifications. All countries where tropical timber is harvested under license of FSC were listed. The audit reports contain information on the forest biome and all countries that had a 'tropical' or 'subtropical' biome were added to a list. This resulted in a list of 28 countries (see Appendix A).

Subsequently, all certifications within these 28 countries were listed, which resulted in a total of 487 certified FMUs. Due to the scope of this research and limited time available, a sample was chosen. This was done through random stratified sampling using the Cochran Formula (Bernard, 2011), where the stratification is done by country. Each country has the same relative share in the sample as in the population. As a result, 102 certified FMUs were included in the study. This sample size allows to estimate proportions with a margin of error under 8,7% and a 95% confidence level.

With regards to the selection of audit reports from these certified FMUs (done in December 2019), the most recent audit reports were chosen, i.e. from November 2018 till December 2019.

## Data collection

### *Literature*

The data collected from the included papers were conceptual frameworks, models, and availability of data sources. For sub-question two, the emphasis was on mapping and summarising different social impact models, hence, the focus during reading and data collection was on models. For sub-question three, the literature and internet search provided insights in the availability of data sources for these models. For further details, see the chapter on results.

### *Audit reports*

The data that are collected from the audit reports were CARs. In the audit reports, the auditors verify the compliance of the certificate holder, in other words the certified Forest Management Unit (FMU), with the FSC standard. When non-compliance is observed, the certification gets a Major CAR, Minor CAR, or an Observation. "Major CARs" represent an ultimatum and correspond to a call for correction within three months of the audit. "Minor CARs" need to be addressed before the next audit. "Observations" are other findings or remarks by the auditors; it is not required to address such "observations" in order to keep the certification.

Subsequently, a list was made with all the socially relevant criteria in the FSC standard on which CARs could be recorded. The development of this list with selected criteria will be explained and discussed in the result section of sub-question 1. See also appendix A for the complete list. For the data collection, CARs on socially relevant criteria were extracted from the audit reports.

## Measurement

The method and conceptual framework guiding the research was partially based on literature (in particular by Peña-Claros et al. (2009)) and partially developed by the author. Because the sub-questions in this project are interlinked, the measurement tools are linked as well. Sub-question 1 outlines social impact in the tropical timber sector, a concept that is then used in the social impact models of sub-question 2 and 3. Furthermore, the definition of socially relevant indicators from sub-question 1 is applied in the data collection and analysis in sub-question 4.

An important part of this research relies on the analysis of CARs. This approach has been used before, mainly by Peña-Claros et al. (2009), and the framework used for this thesis research is a modified continuation of the approach by Peña-Claros.

## Quantitative analysis

To answer the fourth sub-question, a quantitative analysis is carried out. This is a descriptive analysis, using mainly counts, proportions, and frequency distributions. The findings are organised per FSC principle, and social themes are grouped together for easy comparison. The findings are also stratified according to the severity of the CARs (Major, Minor, Observation), and geographically (per country). The results are presented in tables and figures.

Because only a sample (102 certified FMUs) of the total population (487 certified FMUs) for one certification scheme (FSC) is included in the study, there is a margin of error (uncertainty) around the findings. In order to quantify this uncertainty due to random sampling, proportions are presented with 95% confidence intervals. In addition, when proportions are compared, the corresponding P-values

(based on chi-squared tests) are computed. These statistical considerations are only provided for the most important proportions and comparisons in the results section of sub-question 4.

## Reliability and validity

Several considerations can be made regarding the chosen methodology. First, there are multiple ways to identify relevant literature. Although several search strategies were combined, it cannot be ruled out that some papers or data sources and hence, social impact models were missed by this study. This may affect the completeness of the overview of all relevant social impact models.

Second, the choice of the CAR analysis as an indicator of the social impact of FSC-certified tropical timber was based on the work of Peña-Claros et al. (2009). Exploration of alternative indicators and triangulation of the results was outside the scope of this research. The extension (modification) of the framework developed by the author was not formally validated. However, a pilot test with 20 certified FMUs was carried out and discussed with the thesis supervisor of Utrecht University and the director of FSC Netherlands.

Thirdly, this research was not based on all available certified FMUs but on a sample, which introduces some uncertainty. To ensure the validity of the findings, the sample was taken randomly and the main results were presented with 95% confidence intervals.

A further discussion of strengths and limitations is given in the chapter conclusion and discussion.

# Results

## Results sub-question 1

*How is social impact defined and what indicators are used by FSC to measure it?*

## Social impact

In order to understand what social impact FSC has in their tropical timber sector, it is important to come to an agreement on what social impact is and how this term is used throughout this research. Social impact is in itself a broad term applied to a wide range of topics (Vanclay, 2002). In order to make the term social impact applicable for this research a definition needs to be generated. In this part, FSC's view on what social impact is will be interpreted as well as an inclusion of scientific perspectives on this term. In conclusion, a workable definition will be given, used for this research.

### *Literature*

Studies on the social impact of logging and forest certification that investigated social impact or the social aspect of forestry and certification, only focus on a few aspects or variables of this broad concept (Kalonga & Kulindwa, 2017; Miteva, Loucks, & Pattanayak, 2015). A small literature study shows no definition of what social impact is or how this term is operationalized in these researches. Throughout this scientific literature the term is used in different contexts and it proves challenging to merge the interpretations of the term social impact in an all-encompassing definition. What can be concluded from reading these studies is that social impact is an umbrella term that is used to describe the impact on smaller impact categories.

The categories that are referred to in the scientific literature when talking about social impact are: livelihood of forest communities (Kalonga & Kulindwa, 2017), household welfare, village development (Miteva et al., 2015), poverty reduction (Chan & Pattberg, 2008), wages, safety for workers as well as land tenure and conflict resolution (Cerutti et al., 2018) among other things. The common thread in all these researches is the focus on the local population, as to an extent that social impact always amounts to local impact of people in the forest and the surrounding areas. This supposition is confirmed by a more general study done by Dhubháin, Fléchard, Moloney and O'Connor (2008) on social impact of forestry. They explain the impact that forests have on local communities: "forests may generate social values, or be connected with people's lives, in ways that contribute to, or deduct from, social well-being." (Dhubháin et al., 2008, p. 1)

On a meso level, the literature on social impact in general does come with several definitions of the term. Becker (2001, p. 311) for example defines social impact as "consequences of […] current or proposed actions, which are related to individuals, organizations and social macro-systems." Another definition of social impact is formulated by Dietz (1987, p. 56): "A social impact is a significant improvement or deterioration in people's well-being or a significant change in an aspect of community concern." The European Commission (2014) talks about social impact as "the social effect (change), both long-term and short-term, achieved for its target population as a result of its activity undertaken." In conclusion, social impact is a change, both negative and positive, in a population's or community's well-being or other aspects due to intended and unintended actions by an entity or circumstance.

While these definitions all convey a notion of what social impact is, Vanclay (2002) would argue that the term should be redefined with every study and scope. He claims that social impact cannot be

confined to a checklist but is malleable to its situation. One should determine the important issues with local stakeholders, which can result in an operationalization of different indicators or variables.

The term social impact has changed throughout scientific literature. Whereas in the past the main focus was on the negative impact and unintended consequences, it has now also shifted and include the positive and intended consequences (Vanclay, 2002). This shift in perspective is important to be recognised, because it is this positive impact that will be studied in this research. Furthermore, Vanclay (2002) warns about the use of the term social impact because the variables studied in social impact studies are variables on social change that lead to social impact, therefore one cannot conclude on social impact but merely on social change.

### FSC

Social impact and socially beneficial management of the world's forests is one of the three pillars of FSC, next to their economic and environmental pillar. The social side of forestry is important for FSC because "socially beneficial forest management helps both local people and society at large to enjoy long term benefits and also provides strong incentives to local people to sustain the forest resources and adhere to long-term management plans." (FSC, 2015a, p. 6)

The recognition of the importance of the social aspect of forestry is reflected in FSC's 'Principles and Criteria', one of the main documents guiding the organization. This document, that is broadly agreed upon by all members of FSC, provides the base and the core values for the standards that they set out. However, despite the fact this document outlines their principles, among them a focus on the social aspects, it is not clear how social impact is defined by FSC.

When reading their standards, documents and websites, no definition of social impact or how they define social change was found. Throughout these documents, they do elaborate on the different social aspects FSC intends to affect, elaborated upon in different social categories. These social categories confine the impact they would like to have on the local community and the workers, the main target group of their social pillar.

For example, in their global strategy report they talk about the empowerment of "smallholders, women, communities, workers, Indigenous Peoples and other under-represented groups." Furthermore, research on the social impact of FSC name social impact categories such as workers safety and health, improvement of relationships with communities (Breukink et al., 2015), working and living conditions, the availability of institutions through which local people and the company can discuss issues (Cerutti et al., 2014) (Cerutti et al., 2018) as well as provision of health care and educational services. In other words, social impact of FSC is varied and each source highlights different aspects of the social impact that FSC has.

FSC itself talks about social impact most clearly in their Theory of Change (ToC) (FSC, 2014). In here, they mention that the social impact they intend to make are within three areas (see Figure 3). They focus on (1) maintaining good relationships with local communities and the provision of access to (forest) resources for this group, (2) improving their livelihoods and forest management benefits and (3) improving the living and working conditions of workers and focus on health and safety for the community as a whole. Furthermore, in their ToC they do elaborate on the way the principles and criteria contribute to the social impact areas they try to affect. The different documents are therefore not contradictory, but cohesion on their view of the social impact they make is lacking.

Even though these documents do not contradict each other, they do not completely overlap in their statements about social impact. Where the ToC elaborates on what social change FSC intends to make, the Principles and Criteria documents aim to dissect this change into measurable criteria to test whether this change is actually realised. While these documents do not contradict each other, the change mentioned in ToC is not fully reflected in the Principles and Criteria. For example, where the ToC mentions a desired improvement in livelihood of surrounding communities and living and working conditions of the employees, the Principles and Criteria do not mention this improvement: there are no principles, criteria nor indicators that mention (improved) livelihoods.

In conclusion, no clear demarcation of the term social impact is given by FSC, but they do elaborate on the defined social categories and areas they are focussing on. What can be concluded is that their target groups are the local communities around the forests and employees that work in the forest. Furthermore, regarding these groups, they focus on improving the social aspects of forests resources, improved working condition, improved health and safety and general improvement of livelihood.



## FSC intended impacts
### Social, environmental and economic benefits on the ground

**Economic**

1. Forest management (FM) operations gain market advantages through certification
2. Harvesting activities are based on the principle of sustained yields there is a balance of growth and yields of the forest species composition
3. FM Operations gain increased competences for example in planning, impact, assesment and evaluation, silviculture, health and safety, and marketing

**Social**

4. FM operations have good and fair relations with indigenous and any other local communities, and mantain or enhance far access to resources and economic benefits
5. Forest dependent, forest-managing certified communities improve their livelihoods as well as their forest management and marketing benefits
6. FM operations improve worker´s living and working conditions especially with respect to occupational health and safety

**Environmental**

7. Minimized degradation of natural forests, no conversion of forest to other land use in certified areas
8. FM operations mantain or enhance biodiversity. High Conservation Values of the forest are identified with stakeholder input and mantained or enhanced through appropiate management
9. FM operations identify and mantain the forests manfold ecosystem services from forest soil, water, biodiverity

**General**

10. FM operation develop strategies to diversify their portfolio of forest products, and manage a broad portfolio to increase environmental and economic resilence
11. Legal compliance by FM operations and exclusion of ilegal activities within the FMUs
12. Bring together diverse groups of people to craft policy with local (Network) and international (FSC) consistency, empowering marginalized groups with a stake in forestry
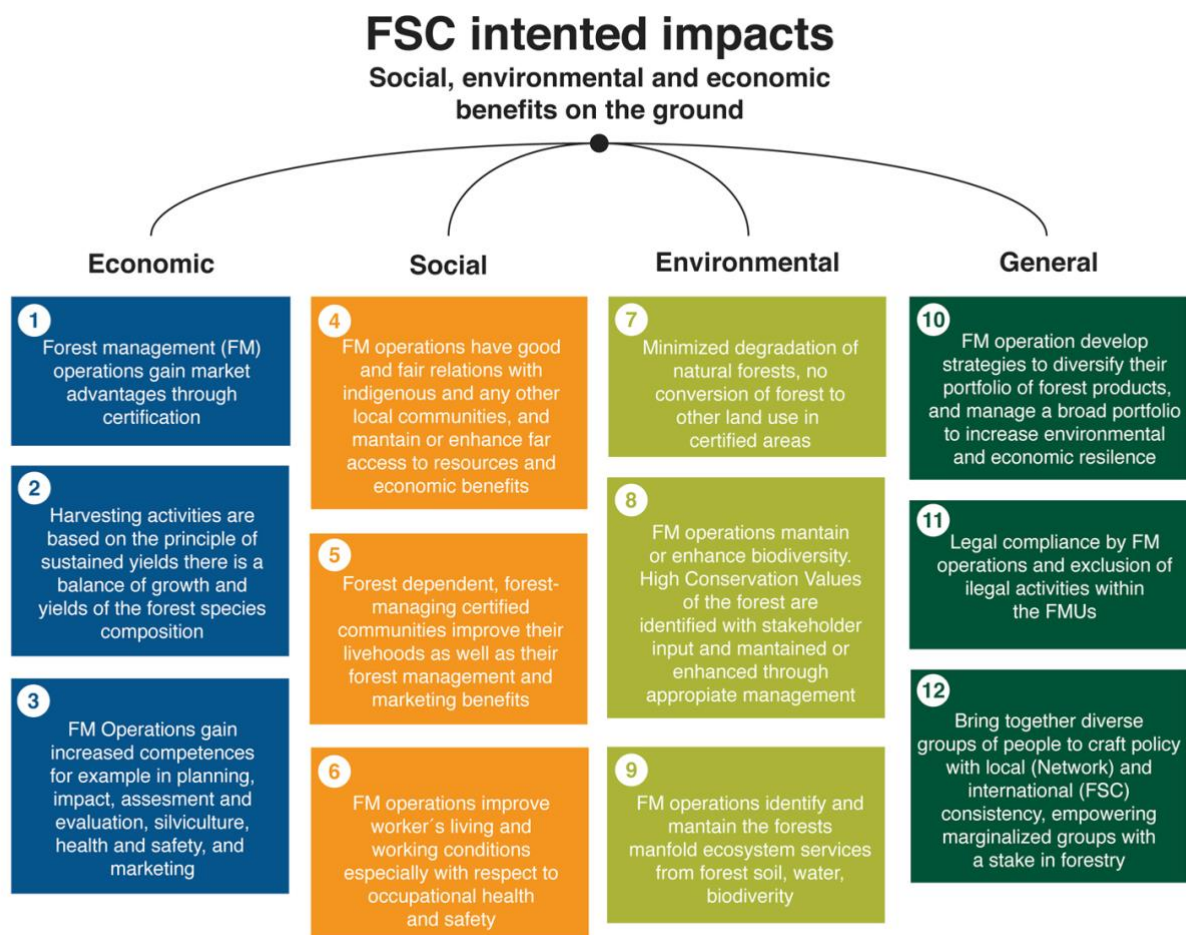
Figure 3 FSC Intended Impact (FSC, 2015c)

### *Research definition*

In short, social impact has many different meanings, varying per context and is sometimes ill-defined. The term is often used in studies as an umbrella term, integrating a variety of possible categories and variables on social wellbeing and improvement of life for local communities.

Given these different meanings of the term, it is important to give a clear operationalisation or definition of this term for this research. The definition that will be used in this thesis is as follows: social impact is the effect that an organisation has with their actions on the lives and wellbeing of local communities and other people directly affected by or included in their actions.

While this definition is meant to delineate the term and its implications for this research, the target group and the actions that will be studied during the research might well be more narrowed down due to limited data availability and thus the definition might vary from the actual outcome. This is because the data that will be available to calculate social impact only contain few variables, like number of employees. These will then be used to discuss the difference between the defined social impact and the social impact of FSC according to the used indicators.

## Currently used indicators

In this section of the research the indicators, used by FSC to measure social impact, are discussed. First an overview of how FSC is structured is given, in order to understand the formation of the principles and indicators. Subsequently the social relevant indicators are assessed and social impact categories identified.

### Structure

In the 1980s, the concern for tropical deforestation already rose and concerns were voiced. During the 1992 Earth Summit, an attempt was made to create an agreement on halting deforestation, but this attempt failed despite increasing concern. Therefore, in 1993 Non-Governmental Organizations and actors from the industry founded FSC to set a voluntary standard that had a marked-based approach to decrease deforestation and improve forests. Thereby creating a shift from government to governance in global politics.

Ever since their establishment in 1993, the FSC has grown and created a history of developing standards and principles through discussion and consensus among all relevant stakeholders. Understanding how FSC is structured will provide insight in how weight is given to the social aspect of SFM and how they, as an organisation, steer towards social impact with their certification.

### Decision-making process

With its certification, FSC tries to set standards for forest owners to adhere to their SFM principles. The decisions on content and the intention of the certification are made in the highest decision-making body: the general assembly. FSC is governed by members, and during the triennial general assembly, they decide on the development of standards and procedures through discussions and submitting motions. During the general assembly there is a three chambers construction, in which social, economic and environmental concerns are addressed. All members are divided in one of the three chambers, depending on their expertise, and each member has a vote in all of the decision that are made regarding the future of FSC. A weighting system makes sure that each chamber has 33,3% of the votes and the southern and northern hemisphere are equally divided, resulting in a balanced system. During the general assembly votes can be cast on motions on, among others, new and developed standards.

Agreements made within these chambers, and thus by the members of FSC, are written down in their standards. These standards form the basis on which FSC operates, subsequently these standards are based on their key document 'Principles and Criteria' (FSC, 2015a). In this standard, the core principles (and their respective criteria) that FSC pursues are written down. In other words, all impact FSC intends to make is embodied in their 'Principles and Criteria', including their social impact.

## A role for certification bodies

In order to assess whether forest owners comply to the principles of FSC, the FMUs are frequently audited by independent third-party certification bodies. The standard 'Principles and Criteria' forms the basis for the audit process. To enforce the principles and criteria and for evaluations to take place, they first are converted to 'International Generic Indicators' (FSC, 2015a, 2015b). Subsequently these indicators are in their turn further converted by different certification bodies so as to create audit standards that are used during the audits, including more specified indicators that fit within the context of that country. This should enable FSC to check whether forest owners are in line with the criteria that FSC puts on FMUs.

With all these steps (from principles, to criteria, to generic indicators, to certification bodies' interpretation for their audit forms), the essence of what FSC really tries to accomplish is diminished to mere interpretations of indicators used as a checklist for audits. The question arises whether these final audit indicators are able to measure the social impact FSC tries to have. When these indicators are used in this study, it is important to remain critical towards the indicators and the extent to which these indicators do reflect the social impact intended by FSC.

## *Focus of FSC and indicators*

When reading the principles and criteria, there is a focus on two target groups: indigenous and traditional people inside the forest area (or 'management unit' as described by FSC) and the local community (including its workers), which is any size of community living adjacent to the forest area or has a significant impact on the forest. A distinction can also be made in social themes that are the focus of FSC:

- Wellbeing of workers:
    - This includes aspects such as workers' rights and safety, minimum or living wages and the ability for employees to follow training.
- Rights of indigenous people:
    - The indigenous people are always consulted when a forest owner is managing an FSC forest. They take into account sites of cultural importance, which are identified with these people. Their access to the land is identified and their knowledge is used where appropriate.
- Community relations, contribution to social and economic wellbeing
    - The forest owner needs to create opportunities for employment and is asked to implement additional services for the community. Furthermore, processes like the processing of wood and other value adding services to the wood should be attempted to be situated or used in the adjacent area.

One could argue that these themes are in line with the intended impacts discussed in the previous section of this research, as described in their ToC (see Figure 3). In conclusion, the intensive standard

setting procedure and the general agreement of the social chamber of the General Assembly has resulted in these focus areas regarding the social impact of FSC.

With each principle and criteria from the standard, comes an indicator. A collection of social relevant indicators has been made, on the basis of the social themes discussed. When all of these socially relevant principles, criteria and indicators are combined there are 4 principles, 29 criteria and 86 indicators that are related to the measurement of social impact. An overview of the principles, criteria and its corresponding indicators relevant for social impact, can be found in appendix B. The indicator's social relevancy is assessed by the author.

# Results sub-question 2

*What (monetary) models exist to calculate social impact?*

In this chapter, the following sub-question will be addressed: What (monetary) models exist to calculate social impact? To answer this question, this paragraph will discuss the choice of using quantitative models and to what extend quantification and monetisation models for social impact are developed. Furthermore, the relevance of internalising externalities will be discussed: as these methods try to do just that. This chapter will be concluded with an overview of the different methods for calculating social impact, as well as what the pros and cons are of each of these methods.

In order to answer the research question, it is necessary to address the different ways and methods a social impact calculation is done. If all relevant models are mapped, a choice can be made on the type of data collection and calculations. This will support the intended goal of this research: to come up with the (quantitative) social impact of FSC tropical timber.

## Monetisation

In the theory, the concept of internalising externalities is discussed. Using a model to analyse the social impact and thereby uncover these positive externalities that FSC tries to create, will help showcase the additional worth certified wood. Manik, Leahy and Halog (2013) also mention that efforts are made to broaden the impact assessments and more importance should be given to evaluate social impact as well, besides environmental impact studies. However, they also confirm that it is not easy to quantify social impact indicator.

One of the impact measurement tools to internalise externalities is monetisation. Monetisation can be defined as a way to account for the (social) negative or positive impact (externality) resulting from an activity and transforming this externality into a monetary value (Morel, Traverso, & Preiss, 2018). Monetisation has as big advantage that the results are expressed in a monetary value which can be easily understood and instinctively compared by consumers (Morel et al., 2018; Velden & Vogtländer, 2017). Therefore, this measurement tool functions as an effective communication tool to society to show what impact a product has.

## Models

The criteria for social impact models useful for this research are reproducibility, relevant for social impact modelling and quantitative or monetisable results. When using these criteria while searching the literature, only few methods were found. They will be discussed below. What stands out is that most of the methods are variations, precursors or successors of the Social Life Cycle Assessment (S-LCA). Furthermore, the monetary methods that are available are all in a less developed state, therefore they are less useful for this research because the method is either unclear or not entirely operational yet. When models are less developed, it means that such models are either only developed theoretically and/or the methodology and information on how to apply such a model is not available yet.

In the following section a brief commentary will be given to the discovered methods. In the table, which is found in appendix B, a full overview of the different models is given, including observations regarding the usability of each method.

### CAR-analysis

Peña-Claros, Blommerde, & Bongers (2009) have done research on the certification of FSC in the tropics. As they noted, on-the-ground studies are costly and time consuming. Therefore, studies using the information in certification reports is used as a way to circumvent on-the-ground studies. Through an analysis of the CARs in audit reports, they claim to be able to assess the impact of certification. Assessing CARs makes it possible to showcase which topics need improvement. This way of doing research is considered to be an indirect way of measuring the impact of certification.

This method uses audit reports of certified FMUs. When analysing this, the conclusions on the social impact are made on the basis of what principles, criteria and indicators are in need of improvement. "Based on the assessment the evaluation team writes an evaluation report. The evaluation report includes general information about the company, the procedure used by the evaluation team to assess if the company fulfilled all the criteria required for obtaining an FSC certification, the results of the consultation process, the results of the evaluation, the decision taken regarding certification, and a list of actions that the company needs to carry out to keep its certification through time." (Peña-Claros et al., 2009, p. 17)

### Social Life Cycle Assessment (S-LCA)

As discussed in the theory, internalising externalities is important for showing the true price of a product, as well as to show the sustainability of a product. In the scientific world there is one prominent method to do just that: Life Cycle Assessment (LCA). LCA is defined as "a multi-step procedure for calculating the lifetime environmental impact of a product or service" ("LCA, LCI, LCIA, LCC: What's the Difference?," n.d.).

Velden and Vogtländer (2017) agree with the fact that LCA is important for the increased sustainability of production and consumption processes. A life cycle perspective brings powerful insights in products in a sustainable development perspective (UNEP Setac Life Cycle Initiative, 2009). Furthermore, S-LCA also needs to play an important role in the "transition towards sustainable production and consumption" according to Velden and Vogtländer (2017, p. 320).

The applications of LCA is mostly relevant when one wants to know the energy and material use of a product. Until recently no commonly accepted method was available to internalise the social aspect of a product (UNEP Setac Life Cycle Initiative, 2009). S-LCA is now used to promote the improvement of social conditions. This model indicates and compares the social impact of different products. The model, however, is still in its infancy (Velden & Vogtländer, 2017): practical application that are reproduceable were not found in this research. Both LCA and S-LCA are designed to give more insight in the externalities (or 'hidden features') of products: "a very popular tool used to provide information on the externalities and internalities for the planet" (UNEP Setac Life Cycle Initiative, 2009, p. 16).

### S-Eco-cost

It should be noted that monetisation has its limitations. Standardizing products, as monetisation does, only works to the extent that these items can be standardized. The less suitable for standardisation an item becomes, the more distorted the standardisation of that item is, when executed. Furthermore, monetisation of non-monetary assets always is an approximation and expressing it in monetary terms never aims to make social aspects transferable nor are they a direct translation of how much money the social impact is actually worth.

Applying monetisation to social impacts is not much practiced in the social sciences and for the forestry sector no such application is available. A first application of the monetisation method in a social category was that of the study done by Velden and Vogtländer (2017) in the apparel sector. In this study they used the s-eco-cost method to monetise the 'external socio-economic burden for workers' and thereby created a quantitative indicator system resulting in a monetary value of the social category 'worker' in the apparel sector. This method is used to express the costs of preventing the amount of social (or environmental) burden of a product. In this case some of the 'burden' categories were that of preventing child-labour and excessive working hours. The (s-)eco-costs are virtual costs and not yet integrated in the real costs of the product (Velden & Vogtländer, 2017). This study shows the possibilities of monetising social impact as a measurement tool and can be considered a first step in monetising more categories of the S-LCA.

However, the methods used in this study cannot be copied to the forestry sector, since the apparel sector and its social impact differ from the timber sector and different categories are used. Furthermore, different data are available in these different sectors, making the choice for available methods different as well. This study gives a solid first step in the application of monetisation in the area of social impact and shows that s-eco-cost is one potential method for monetising social impact in the forest sector.

### (Societal) Life Cycle Costing (LCC)

When talking about monetisation, LCC is one of the most prominent methods out there. Depending on the context DALY is used to get to this monetary output. DALY stands for Disability-Adjusted Life Year, which means the cost in life years (converted to monetary value) that are added or subtracted from a subject's life. LCC is created to mostly compare assets and to determine the most cost-effective option. This is done by adding up all the costs of ownership of that asset, including different phases like procurement, use and disposal. It differs from LCA in that the calculations are all done in monetary terms.

A great advantage of LCC is that the output value is money. However, critics say that it has "too much emphasis on financial returns: wider socio- economic gains need to factored in". (Perera, Morton, & Perfrement, 2009, p. 6)

The social alternative for LCC is societal life cycle costing (SLCC). "This approach has a larger perspective and includes all costs covered by anyone in society, whether today or in the long-term future. This means that besides costs assessed by conventional and environmental LCC, also additional social and environmental externalities are considered and converted into monetary terms." (De Menna, Loubiere, Dietershagen, Unger, & Vittuari, 2016, p. 6)

### Eco Social Cost Unit (ESCU)

As part of the Oiconomy project, Croes and Vermeulen (2016) created ESCU. This is a monetary method and is a continuation of the S-Eco-Cost value. Like s-eco-cost value, this method has a focus on preventive cost, meaning they focus on what does not go wrong rather than what goes well or even what positive impact is created.

The definition of ESCU is given by Croes and Vermeulen (2015, p. 180): "The OS considers all frequently described issues, mostly obtained from available international standards and guidelines. The ESCU is the sum of the preventative costs for all issues."

## In conclusion

Different models are already available within the sphere of scientific communities and sometimes already in application by institutes such as the European Union. When contemplating the advantages and disadvantages of the model, a selection can be made on which model fits the objective of this research best. In appendix C a table with an overview of each model is given, as well as consideration made by the author on the applicability of each model.

In brief, most of these models are still in its infancy phase: they are developed theoretically but applicable examples of such models are not available yet. These are, among others, the S-Eco-Cost and the ESCU model. While these models make monetisation possible, lack of development of a finished model is for this research, a shortcoming whilst applicability is necessary to make an assessment, rather than having a theoretical framework. Furthermore, other models, like SLCA and SLCC, require elaborate data, most often from cradle to grave. The results from sub-question 3 will highlight the unavailability of much social and forest related data. Therefore, these models cannot be used for social impact assessment in the forestry sector yet.

In conclusion, given the applicability, tailored fit for the forestry sector and the fact that the model has already proven itself in research done by Peña-Claros et al. (2009); it can be concluded that the CAR-analysis is the best model at the moment to assess the social impact of FSC tropical timber, despite its inability to monetise the results. Further details are discussed in the table in appendix C.

## Results sub-question 3

*What data are available to use for tropical timber social impact calculations and what data are missing?*

## Data specification: impact categories

In answering the third sub question, it might prove useful to keep the goal of this research in mind: to model or analyse the social impact of FSC social timber. The research question is: What data and indicators are required to construct a model for monetising social impact of FSC tropical timber? When considering data to be used for this research, there are two aspects to acknowledge. First the scale of the research. In this research, all the countries where tropical timber is harvested under license of FSC will be analysed. Therefore, data are needed from potentially 28 countries (see Table 7 in Appendix A). Secondly, the type of social data that can be found should be fitting with the data necessary for this research: there is a need for local and context specific information on the social effect that FSC forestry has on the community. Therefore, it is necessary to assess which social impact categories are relevant for this social impact analysis. Furthermore, compressing it in impact categories will make the data collection comprehensible because the type of social impact that FSC has and the form in which this is expressed will vary per country.

The chosen impact categories can be divided into 'direct impact', 'working conditions' and 'indirect effects'. While these categories are not mutually exclusive from each other, they are subdivided this way in order of relevance to data availability. The 'direct impact' category is suspected to be easily measurable and attainable in primary data sources. The category 'working condition' are indirect impacts on the wellbeing of workers. It focusses on the vital benefits workers can receive during their work. This is separate from the category 'indirect effects' which contains measures targeted on workers and other socially relevant groups (like the local community). This does give direct social benefits to the employees and is not the primary focus of the business: making sure that forests are sustainably managed. The division of these impact categories is done arbitrarily on the basis of the literature. The suggested impact categories can be found in Table 2.

The working conditions and indirect effects are important to take into account when assessing social impact, because Breukink et al. (2015) suggest that the social impact is in most cases not visible in an increase of income or loan. Their study shows that certification does not always lead to an increase in salaries, nevertheless spending on working benefits is increased. Thereby suggesting that an investment in health care and other social support (i.a.) leads to improved social wellbeing (Breukink et al., 2015). The impact categories are based on the principles of FSC, as can be concluded from the results from the first sub question, mostly principle 2. This principle is on workers' right and employment conditions and has indicators on wage and worker safety procedures. This assures that FSC is indeed targeting this social impact as well as an increased likeability that this information is reflected in potential data sources from FSC. A list of the right impact categories for this research can never be exhaustive since there will be means in which an organisation has an intangible social impact in other forms (Cerutti et al., 2014). For choosing the social impact categories, conclusions were drawn from experts on social impact modelling and the most relevant categories (applicable to FSC's intended impact) were extracted (Benoit-Norris, Cavan, & Norris, 2012; Cerutti et al., 2014; Falcone & Imbert, 2018; Velden & Vogtländer, 2017). The impact categories that are discussed in this literature can be found in Table 2. Table 3 shows the categories that these authors considered important and socially relevant. The impact categories that show up repeatedly (three or more times) and that have similarities with aspects that FSC focusses on were chosen as relevant social impact categories.

| Direct impact | Working conditions | Indirect effects |
|---|---|---|
| Income or loan per worker | Access to health care | Housing |
| Number of jobs created | Worker safety | Water Quality |
| | Labour rights | Access to Educational Services |

Table 2 Social Impact Categories

| | Benoit-Norris, Cavan, & Norris, 2012 | Cerutti et al., 2014 | Falcone & Imbert, 2018 | Velden & Vogtländer, 2017 |
|---|---|---|---|---|
| **Employment** | X | | X | X |
| **Wage Assessment** | X | X | X | X |
| **Safety Conditions** | | X | X | X |
| **Labour Rights** | X | X | X | X |
| **Legal Systems/Governance** | X | X | | |
| **Enforcement of negotiated rules by local population** | | X | X | |
| **Human Rights** | X | | X | |
| **Human Health** | X | | | |
| **Food Security** | | | X | |
| **Quality of Housing** | X | X | X | |
| **Access to Health Care** | X | X | X | X |
| **Access to (Improved) Drinking Water** | X | X | X | |
| **Access to (Improved) Sanitation** | X | | | |
| **Access to Education** | X | X | X | |
| **Infrastructure provided** | | X | | |
| **Access to Land** | | | X | |
| **Gender Equality** | | | X | |

Table 3 Discussed impact categories in literature

## Data sources

The social impact categories articulate that the social impact is on a local level. Given the scale of the research and due to the fact that the intention is to conclude on 28 countries, the data(banks) have to, subsequently, contain information on all these countries. Searching for these data is done in a systematic way. Data sources were explored on a macro level (public databanks), a meso level (sources on forestry on a country level) and a micro level (FSC sources).

### Macro: Public data(banks)

Despite the fact that public databanks are good sources for worldwide socio-economic information on a national level, public databanks do not provide relevant data as input for this research. This is because the data from these sources are not site specific but most often on a country level. This cannot describe the (local) impact that FSC has. Furthermore, data on this level can by definition not contain data on impact brought about by FSC.

Following this line of reasoning, data from databanks like FAOStat, the World Bank and UNStat seem to be less relevant for case specific data. Moreover, because these databases do not contain other forestry related data on a country level. Public databanks could be used, however, to provide social information or socio-economic context.

### Meso: National Risk Assessments (NRA)

In order to find more forestry specific information per country, the NRA (related to forestry) of several countries were consulted. The NRA is a collection of information from different sources related to the forestry sector of that country. The most important findings are summarized in these reports.

When the NRA of Brazil and Mexico are studied, it can be concluded that the detail on (social) risks and the volume of sources consulted are vast. The NRA summarizes the most relevant findings on perceived risks for the timber sector, such as illegal logging and health and safety. When elaborating on potential risks for specific aspects most of the explanation is a summary of applicable rules, laws and conventions. While this is relevant for policy-oriented decision making, it does not give quantitative (social) data. Especially not the needed comparative data for this research on topics such as accident rates, or any other comparison between non-certified wood and certified wood. Furthermore, the data mentioned in the NRAs were most often not specific for the timber sector.

Whenever the data and information in NRA are not rules, laws or conventions, the data are mostly qualitative or anecdotal evidence. This could be useful for giving socio-economic context to local or country level aspects of the forestry sector in particular and social issues in general. In conclusion, the NRAs do not provide quantitative (or comparative) data.

### Micro: Audit reports

With a need for more localized and context specific data and taking the social impact categories as point of departure FSC sources itself were considered. Company reports of companies that are FSC certified were available. Nonetheless, not all companies have a website nor a company report and the data that are available in these reports is limited, seldom quantitative and most often not on the discussed impact categories.

After consultation with 'FSC Nederland' employees and an inquiry among international FSC colleagues, it can be concluded that FSC does not have a database with (social) data. No data are centrally collected on, for example, how much schools are built by companies that are licensed by FSC, on the salary of employees or on improvements of (drinking)water quality by the company. The only data that are available are the number of forest certificates and the total amount of hectares that are FSC certified worldwide (fsc-int.maps.arcgis.com).

FSC does have a public database in which all the certified FSC FMUs can be found. Linked to these entries are audit reports. An advantage of the audit reports is that they are context and community specific (it shows local information) and it can be found for each FMU that is certified in each country. The locality of the audits is complemented by the vast amount of audit reports available (4.150 reports for 488 companies (as of November 2019)): in this way the data can be used for assessments on both a local scale and a regional scale. It can be concluded that, for the scope of this research, it is the best suitable database containing relevant information. The advantages of audit reports are:

- They are publicly available.
- All FMUs are subjected to these audits, this creates a certainty that information is available for all the FMU (and all the countries). In this way one can get an understanding of the general social impact of FSC.
- The audit reports contain some form of social data such as number of jobs created and worker safety.
- It is up-to-date information: the audits are performed and published yearly.

### Objectivity

In order to get an objective understanding of how FSC has a social impact it is of importance that the data for the analysis are not biased. The advantages of using audit reports as data source is that the reports are written by third-party audit bodies. FSC is the standard making organization and in order to get certified the FMU needs to adhere to the standards that FSC creates. The auditors are third-party actors that verify whether the FMU adheres to the rules. This makes audit reports as a source more objective. Furthermore, the FMU pays the audit bodies a fee that the audit bodies decide; FSC does not come into play. FSC regularly examines the audit bodies on their neutrality. Furthermore, suspicion of corruption can be reported to FSC and will subsequently be reviewed. All audit bodies are accredited with Assurance Services International ("Certification bodies / 'certificate holders' transparency," n.d.).

## Data in audit reports

In conclusion, the most relevant data can be found in audit reports. However, the audit reports are inconsistent in reporting: different audit teams and different audit bodies have different methods of reporting. This leads to scattered data that are frequently obscured in the text. After reviewing the audit reports, an overview of what data are available can be given:

Data that were (almost) consistently available in all audit reports:

- Number of employees (divided into men and women) in each company, both temporary (seasonal) and permanent workers.
- Number of accidents, including fatal.
- Number of hectares for Non-Timber Forest Products.

- Non-Timber Forest Products accessibility could indicate the willingness of the company to allow community members to use the forest for their livelihood. Shanley, Pierce, Laird and Robinson (2008) state that Non-Timber Forest Products plants and trees are critical for subsistence livelihoods and local trade.

Data that were available only in some of the audit reports:

- An indication of wage. E.g. whether employees get more than $2 per day.
- Housing and sanitation facilities for employees.
- Whether schools were built (no numbers given) by the FSC-certified company.

Hence, only isolated information is found for all of the impact categories. In reference to the social impact categories, it is noted that only data on the 'direct impact' category (income per worker and number of jobs created) are consistently available in the audit reports. Still, the indicators of wage were insufficiently available throughout the audit reports. Out of the 103 analysed audit reports, 36 gave an indication of wage and 23 of those merely stated that the wage was 'more than $2 a day'.

## CARs

The most important aspect of the audit process and report is to verify whether the company adheres to the standard and criteria set by FSC. Whenever noncompliance is encountered, the auditors give the company a notice: a CAR. This CAR needs to be addressed by the next audit in order to maintain the certification. An overview of the given CARs during an audit is a way to see where FMUs do not meet the social impact that the FSC standard pursues. Collecting and analysing the CARs gives an indication to what extent the FMUs achieve the intended social impact. If all the criteria are met, it can be stated that a certain level of social impact is obtained.

For example, if non-conformity with worker-safety regulation is present, this is indicated with a CAR. In this way, it can provide information on the impact category 'Worker Safety'. If all social impact relevant CARs are monitored, an overview can be made of how each FMU performs on the given social criteria by FSC. In the first chapter an overview is given of which Principles and Criteria are relevant to consider. Therefore, it can be concluded that the CARs that can be found in audit reports can function as data input for analysing the social impact.

## Lack of consistent data

As mentioned, the audit reports are inconsistent in reporting. There are 487 FMUs (or certificate holders) that have a total of 4636 audit reports. There are eight different audit bodies (in the tropical region) that each structure and record their reports differently. This leads to scattered data throughout the reports and inconsistency in the way CARs are reported. Furthermore, there is difference between countries on what is audited and reported.

Most importantly, whenever additional social data (such as the number of houses available for employees) are available, it is often reported in comment sections throughout the report. This information is often qualitative and anecdotal but dispersed throughout the report.

Due to this dispersion, but mostly because only very few audit reports contain these additional social data, it is not possible to use these data for comparison across different FMUs. The use of inconsistent (incomplete) data may lead to a distorted depiction of reality. For example, whenever an FMU might undertake socially beneficial projects but the auditors do not report on them.

This inconsistency has led to the decision to not use these data, despite it being the relevant datatype for this research. While CARs are consistently available in reports, other social data are not. For this reason, it is chosen to no be incorporated in the extracted data.

## What data are missing

By choosing CAR data as input for analysing the social impact of FSC, the impact is measured in an indirect way (Peña-Claros et al., 2009). The data that are needed for a more direct measurement of impact were discussed in the impact categories. Due to the nonexistence of a (social) databases on the impact of FSC or forestry, there is a data gap between the data that are available and the desired data.

For a proper analysis of the social impact of certified timber, it is relevant to compare it to non-certified timber (production). In this way an analysis can be made on how the social impact compares to other situations. The inquiry for these data resulted in a conclusion that no such data exist, which makes for an important data gap.

Furthermore, the studies that are done on the social impact of FSC (of which some compare non-certified and certified) are qualitative studies. Moreover, most of these studies are case studies: in this way one can do an in-depth and detailed research on the community level. This is the predominant and successful methodology in social impact assessments (Bonilla-Alicea & Fu, 2019). This proves the suitability of case studies when doing research on social issues. However, this does not aid the data availability for large scale comparison such as in this research: large scale availability of this detailed data is another data gap.

## In conclusion

In conclusion, there are no (consistent) data available on the social impact categories chosen for this research. Searching in public databanks, company reports, NRAs and in FSC databases yielded no results. Furthermore, these data could not be found consistently in audit reports either, except for CARs and the indicator of 'number of jobs created'. An overview can be found in Table 4.

| | Income/Loan per worker | Number of jobs created | Access to health care | Worker Safety | Labour rights | Housing | Water Quality | Access Educational Services |
|---|---|---|---|---|---|---|---|---|
| *Public Databanks* | Irrelevant: not fine-tuned for the local context. | | | | | | | |
| *Company Reports* | I* | I* | I* | I* | I* | I* | I* | I* |
| *NRA* | Some information/data, but not forestry specific. | | | | | | | |
| *Audit Report* | I* | Yes | I* | CARs | I* | I* | I* | I* |

*1: Sporadic and inconsistent

Table 4 Overview of results on data availability

The FSC 'Principles and Criteria' that are used for the audit and thus for assigning CARs only overlap with the social impact category of 'Worker Safety'. This concludes that on five of the seven categories no data source can provide these data for multiple countries (see table). The only data that overlap with the impact categories that can be used are: the number of jobs created by FSC certified FMUs and the CARs on 'Worker Safety'. The conclusion of the sub question is that the right approach, given the data availability, will be the indirect impact measurement due to limited availability of direct data. Therefore, CARs are chosen as the data input for measuring the social impact of FSC tropical timber. In addition, this results in the method of audit analysis as chosen method for this research.

# Results sub-question 4

*What is the social impact of FSC-certified tropical timber based on the results of the data-analysis?*

*Note on this chapter: the data representations in this chapter are static screenshots of interactive data visualisations. In order to understand the results fully,and get a grasp of the data behind the visualisation, the reader is advised to (also) visit the published visualisations online via the link provided. Additional data and data visualisations can be examined here as well.*

The data from the CAR-analysis are visualised and interpreted in the following chapter. When the data get extracted from the audit reports, the following conclusions can be drawn. This chapter will go over the different results that are gathered after analysis of the data.

The results are based on the assumption that when an FSC FMU is performing in perfect compliance with the FSC standard, they have met the FSC intended social impact. The results will illustrate to what extent this is achieved on principle and country level. Further clarification will be given to the most important social aspects. Other relevant aspects available in the audit data will be discussed, such as the number of employees and the number of accidents.

In some of the following figures, the CARs are weighted in order to put the CARs more into perspective. Whenever this weighting is applied, it is indicated in the figure or caption. This results in a gradation of the different CARs. Major CARs are given as an ultimatum and need to be corrected within three months of the audit. Minor CARs are criteria that are not met and need to be addressed before the next audit. Observations are mere findings that are noted in the audit report and could be improved upon but are not necessary in order to keep the certification. In the following results majors CARs are weighted eight times more than observations and minor CARs are weighted three times more than observations. Due to the severity of the CARs, this allows for better comparison. An FMU that has only one observation could not be considered equal to an FMU that has a major CAR.

The results from this analysis are a snapshot: illustrative for how the FMUs performed in 2019. The data are therefore indicative and the results cannot give robust conclusion. The principles, in particular principle 2 (worker's right and employment conditions), are ever evolving and the data are mostly on people: this cannot be caught in static figures. Furthermore, these audits continue to be carried out throughout the years.

## Impact on a principle level

| | Theme | Description |
|---|---|---|
| *Principle 1* | Compliance with laws | The Organization shall comply with all applicable laws, regulations and nationally-ratified international treaties, conventions and agreements. |
| *Principle 2* | Workers' Rights and Employment Conditions | The Organization shall maintain or enhance the social and economic wellbeing of workers. |
| *Principle 3* | Indigenous Peoples' Rights | The Organization shall identify and uphold Indigenous Peoples' legal and customary rights of ownership, use and management of land, territories and resources affected by management activities. |
| *Principle 4* | Community Relations | The Organization shall contribute to maintaining or enhancing the social and economic wellbeing of local communities. |
| *Principle 5* | Benefits from the Forest | The Organization shall efficiently manage the range of multiple products and services of the Management Unit to maintain or enhance long term economic viability and the range of environmental and social benefits. |
| *Principle 6* | Environmental values and impacts | The Organization shall maintain, conserve and/or restore ecosystem services and environmental values of the Management Unit, and shall avoid, repair or mitigate negative environmental Impacts. |
| *Principle 7* | Management planning | The Organization shall have a management plan consistent with its policies and objectives and proportionate to scale, intensity and risks of its management activities. The management plan shall be implemented and kept up to date based on monitoring information in order to promote adaptive management. The associated planning and procedural documentation shall be sufficient to guide staff, inform affected stakeholders and interested stakeholders and to justify management decisions. |
| *Principle 8* | Monitoring and assessment | The Organization shall demonstrate that, progress towards achieving the management objectives, the impacts of management activities and the condition of the Management Unit, are monitored and evaluated proportionate to the scale, intensity and risk of management activities, in order to implement adaptive management. |
| *Principle 9* | High conservation values | The Organization shall maintain and/or enhance the High Conservation Values in the Management Unit through applying the precautionary approach. |
| *Principle 10* | Implementation of management activities | Management activities conducted by or for The Organization for the Management Unit shall be selected and implemented consistent with The Organization's economic, environmental and social policies and objectives and in compliance with the Principles and Criteria collectively. |

Table 5 All FSC Principles and their descriptions

Firstly, the distribution of all the CARs among the principles will be discussed: which principles prove the hardest to comply with for FMUs. Figure 4 illustrates this: it shows the percentage of the total of the (socially relevant) CARs attributed to each principle. Subsequently, Figure 5 shows the compliance rate of the principle, in which it shows how many of the FMUs have any CARs on that principle. As

an example, principle 7 has 5,1% of all the CARs attributed to it (Figure 4 and for reference Table 8 in appendix D) and has a compliance rate of 93,1% (Figure 5). The compliance rate is the percentage of FMUs that have no CARs on this principle. These figures illustrate to what extend each principle is carried out and where the FMUs are able to meet the norm that FSC has set: the social impact norm.

In the following section, the conclusions and data of the different principles will be discussed. From the results, it can be concluded that the most socially relevant principles have the most CARs. Therefore, these aspects prove hardest to live up to. However, it is not the case that the ratio indicators (used for data collection) per principle is indicative for how many CARs are attributed to that principle. Figure 4 illustrates that, for example, principle 8 only has 2,5% of all the indicators that were reviewed during the data collection while it has 13,5% of the CARs in all audits.

Figure 6 is indicative for the distribution of CARs among the principles. It clearly shows that principle 2 has most CARs. Concerning the content of the principles, Table 5 will be used as a reference to all the principles available. It should be noted that principle 10 (implementation of management activities) is considered to be not socially relevant (see Table 5). No relevant indicators or criteria were found in the FSC standard (for reference see Table 8 in appendix D) and thus principle 10 is left out in further results and analyses.
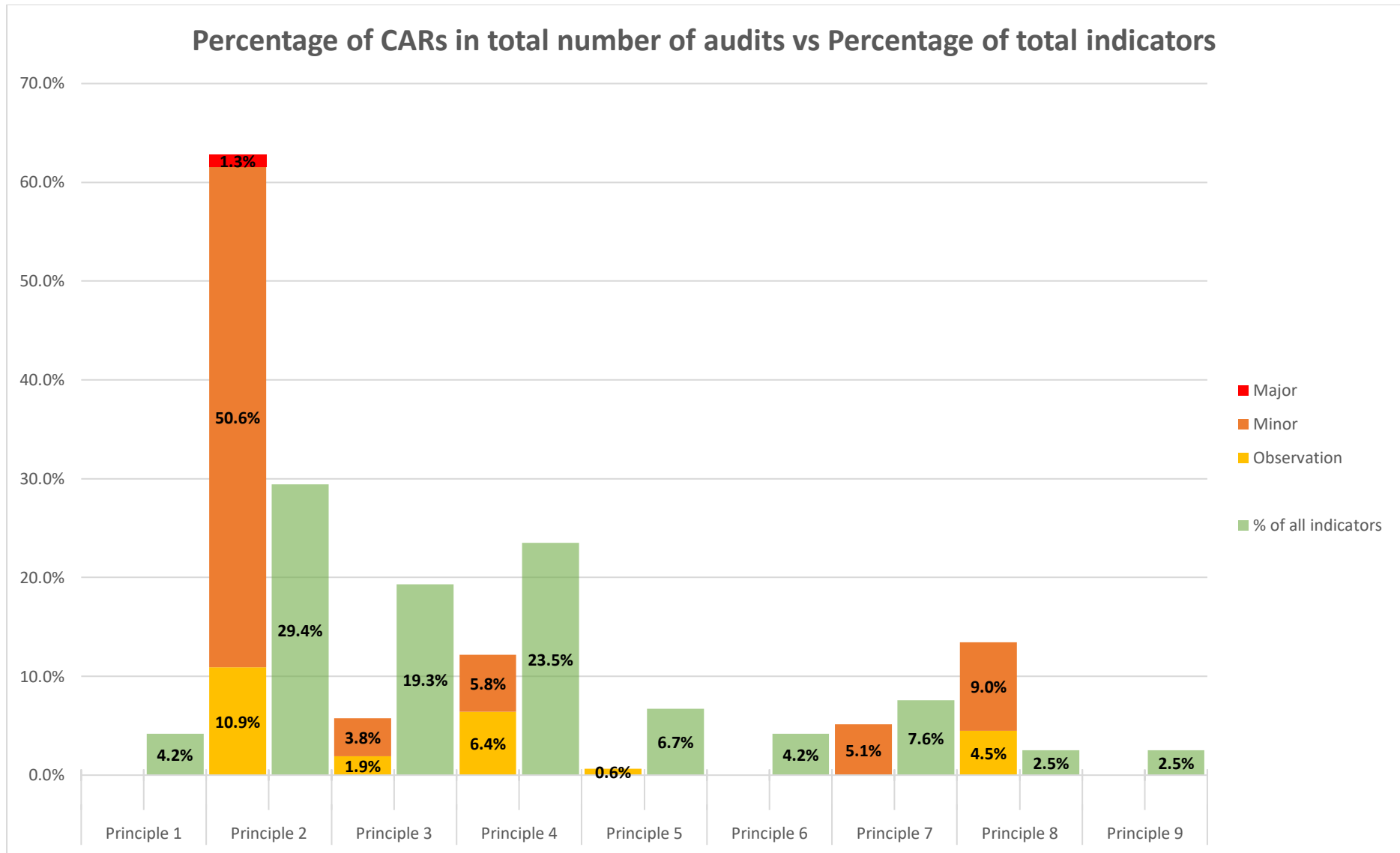
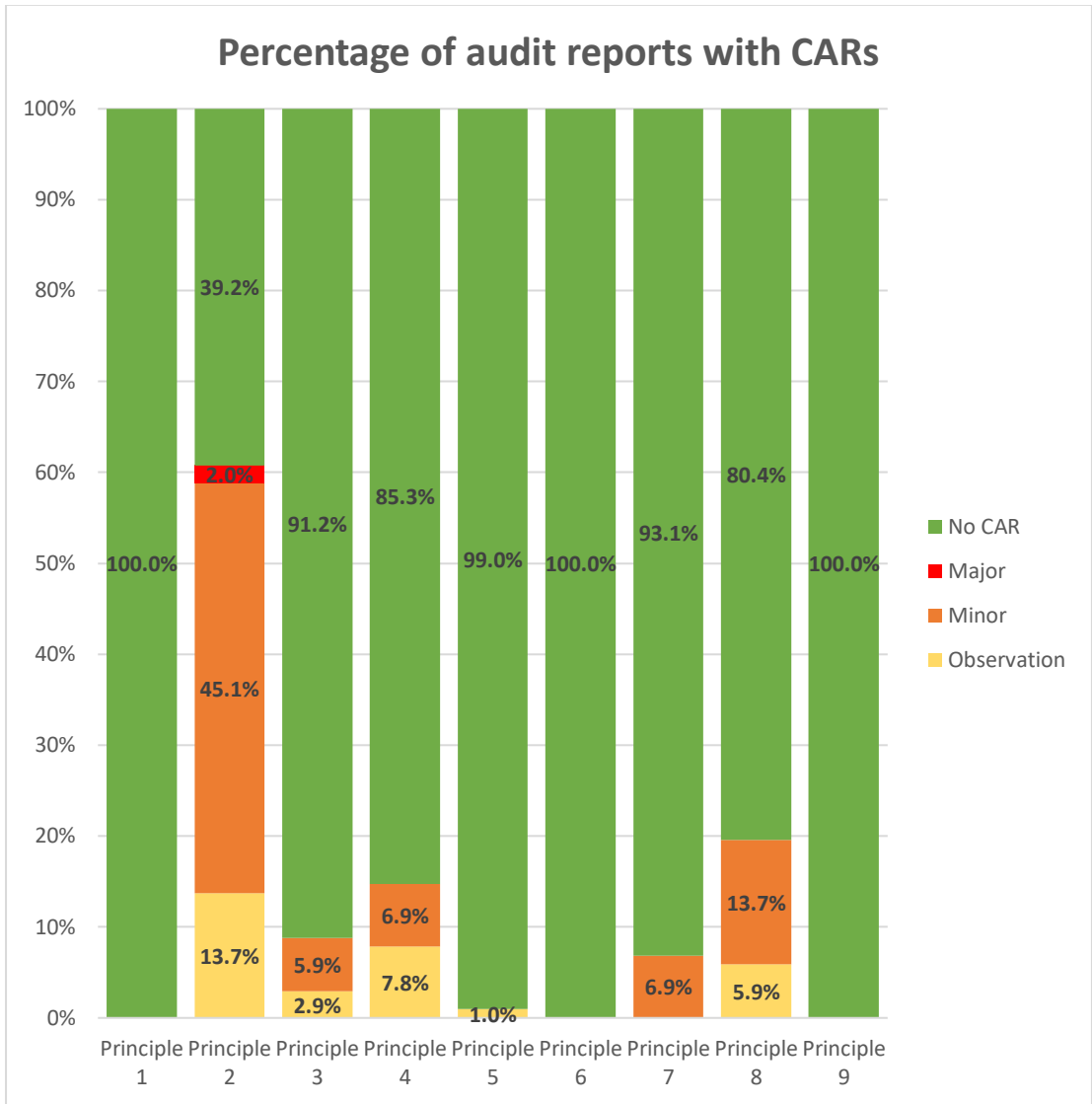Figure 4 The percentage of CARs in the total number of audits and the percentage of total indicators

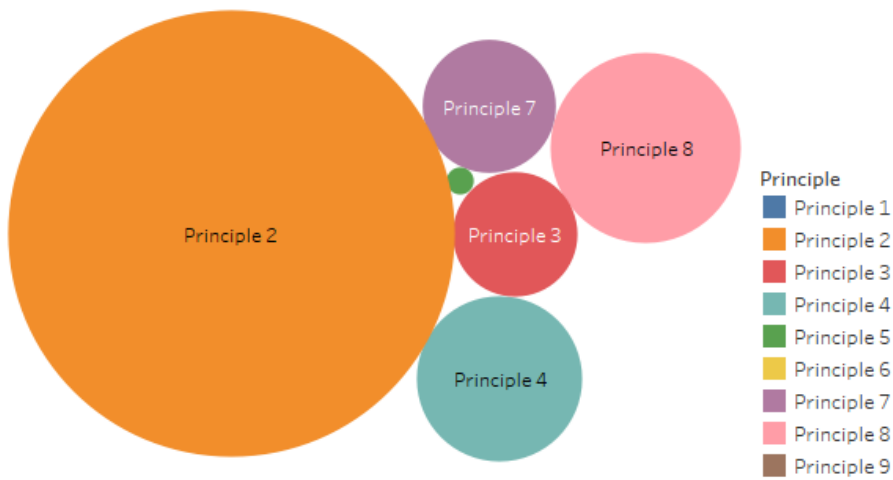Figure 5 The percentage of audit reports with CARs



Figure 6 Bubble chart of the relative amount of CARs attributed to each principle

*Principle 2*

Principle 2 has as theme 'Workers' right and employment conditions' (see Table 5). It can be affirmed that the most CARs in all audit reports are reported on principle 2: 98 out of 156 CARs (63%, with a 95% confidence interval of 55% to 70% for the entire population) (see Table 9 in appendix D and Figure 4). Furthermore, this principle surpasses all other principles regarding the number of CARs in the data.

This could have multiple explanations. The first explanation could be that principle 2 is given more weight by auditors and therefore it is more enforced. This principle is then more inspected or under better supervision, this results in more CARs being given. Furthermore, it could be the case that the FMUs act structurally inadequately according to this principle in all countries. This could be because the bar set for this principle and its criteria is high: the principle is difficult to achieve. Most likely, the aspects that this principle assesses are indeed structurally going wrong. For instance, the helmets that need to be worn on site are consistently not worn. These general explanations could also be given for other principles than principle 2.

Furthermore, out of the 119 indicators assessed during the audit report analysis, 35 were from principle 2 (29%) (for reference see Table 8 in appendix D). That is the most of all the principles. In this view, it is plausible that the most CARs were to be attributed to principle 2. However, the number of CARs attributed to this principle is more than double the number of indicators reviewed for this principle (see Figure 4). Therefore, the quantity of the CARs still concludes that with these aspects of this principles (e.g. safety practices, paying of equal wage, training) it does not conform fully to FSC standards.

*Principle 1, 5, 6 and 9*

Figure 4 and Figure 5 (as well as Table 9 in appendix D) show that principles 1 (compliance with law), 6 (environmental values and impact) and 9 (high conservation value) do not have any CARs at all. These principles had three (for principle 9) or five (for principle 1 and 6) indicators reviewed in the data collection. In other words, in the audit data only few of the 119 indicators that were reviewed were attributed to these principles. In addition, these principles are also less socially relevant (see Table 5). In conclusion, while these results were predictable, it can be stated that they did have socially relevant criteria and therefore principle 1, 6 and 9 have a 100% compliance score (with a 95% confidence interval of 96,4% to 100% for the entire population) regarding the social impact that the FSC standard intends to have (see Figure 5).

Furthermore, principle 5 also did score high. The theme of principle 5 is 'Benefits from the Forest'. The results show that only 1 CAR is given on this principle (which was an 'observation'), while it has two socially relevant criteria. Principle 5 therefore has a compliance score (to the FSC standard) of 99%. While these principles are less socially relevant, the few indicators that are assessed in the audit are mostly complied to.

*Principle 4 and 8*

Principle 4 (community relations) and 8 (monitoring and assessment) are similar in number of CARs given. Principle 8 is on monitoring and assessment. Despite having only three indicators that the audit reports were checked on it does give the second biggest number of CARs attributed to it. The criterion that was reviewed was whether the social impact of the activities carried out by the Management Unit were evaluated and monitored. With 21 CARs for principle 8, it can thus be

concluded that this is not consistently carried out by the companies. Principle 8 has a compliance rate of 80,4% (with a 95% confidence interval of 72% to 87% for the entire population)(see Figure 5), close to one fifth of the companies did not comply with all the criteria for principle 8.

Principle 4 also has high social relevance. This principle is on community relations and its aim is to contribute to the community. This is the principle with the third most CARs. 28 indicators were taken into account when analysing the audit reports. 19 CARs were found in total for this principle. Principle 4 has a compliance rate of 85,3% (with a 95% confidence interval of 77% to 91% for the entire population)(see Figure 5). It should be noted that the majority of the CARs in principle 4 are observations: these have a lower severity than Minor or Major CARs.

### Principle 3 and 7

While principle 3 (indigenous peoples' rights) evidently has social relevance, the number of CARs attributed to this principle is low. Even though 23 indicators were checked upon in the data collection, only nine CARs were found in total. This could be because only a portion of the sample has indigenous communities in their forest and therefore also a smaller portion of the CARs will be attributed to this principle. Additionally, the lower number could be the result of this principle being easier to uphold. The compliance rate of principle 3 is 91,2% (with a 95% confidence interval of 84% to 95% for the entire population)(see Figure 5).

Principle 7 (management planning) has eight CARs attributed to it, all of them being Minor CARs. Nine indicators were taken into account for the audit report analysis. Principle 7 and its criteria are on the management planning and therefore on the administrative aspect of the company and whether the management plans take into account socially beneficial aspects. Principle 7 has a compliance rate of 93,1% (with a 95% confidence interval of 86% to 96% for the entire population)(see Figure 5)

## Principle 2

| | **Description** |
|---|---|
| *Principle 2* | The Organization shall maintain or enhance the social and economic wellbeing of workers. |
| *Criterion 2.1* | The Organization shall uphold the principles and rights at work as defined in the ILO Declaration on Fundamental Principles and Rights at Work (1998) based on the eight ILO Core Labour Conventions. |
| *Criterion 2.2* | The Organization shall promote gender equality in employment practices, training opportunities, awarding of contracts, processes of engagement and management activities. |
| *Criterion 2.3* | The Organization shall implement health and safety practices to protect workers from occupational safety and health hazards. These practices shall, proportionate to scale, intensity and risk of management activities, meet or exceed the recommendations of the ILO Code of Practice on Safety and Health in Forestry Work. |
| *Criterion 2.4* | The Organization shall pay wages that meet or exceed minimum forest industry standards or other recognized forest industry wage agreements or living wages, where these are higher than the legal minimum wages. When none of these exist, The Organization shall through engagement with workers develop mechanisms for determining living wages. |
| *Criterion 2.5* | The Organization shall demonstrate that workers have job-specific training and supervision to safely and effectively implement the management plan and all management activities. |
| *Criterion 2.6* | The Organization through engagement with workers shall have mechanisms for resolving grievances and for providing fair compensation to workers for loss or damage to property, occupational diseases, or occupational injuries sustained while working for The Organization. |

Table 6 All FSC criterion for principle 2 and their description

As discussed, principle 2 has the most CARs, therefore the following section will focus more closely on principle 2. Figure 8 shows that in most countries principle 2 has at least half of the CARs in comparison to other principles.

When looking into principle 2, the division of CARs among criteria can be demonstrated. Within Principle 2, the most CARs are attributed to criterion 2.3 (see Figure 7). This criterion is on the implementation of health and safety practices to protect workers from occupational safety and health hazards (see Table 6). In the audit reports, whenever a CAR was assigned to criterion 2.3, the auditors mostly commented on the non-availability of safety equipment and the fact that safety equipment was not worn despite it being available. This is in alignment with statements of FSC employees that have visited these sites: a common observation was that helmets were quickly put on whenever an official would visit the work area. Therefore, with principle 2 being the principle with the most CARs and criterion 2.3 having the largest share of these CARs, it can be concluded that the least complied to social aspect in FSC tropical forests is the implementation of health and safety practices.

Other criteria are also worth mentioning when discussing the number of CARs. Firstly, there is a section of the pie chart labelled '2'. These are all the CARs that do not fit under the descriptions of any of the other criteria in principle 2. There are differences in the national interpretations of the international FSC standard (the standard that is used for this analysis). This leads to some new criteria relevant for the national context, that do not fit under the international standard. For example, in

some countries the criterion of 'drinking water accessibility at the workplace' is important. This is not a criterion in the international standard. Because some countries do have this criterion, some audit reports contain criteria that do not fit under the umbrella of the international descriptions of principles and criteria. For sake of comparison in this research, all the country indicators and criteria were assigned to their relative criteria in the international standard. Therefore, some of the criteria that are socially relevant were included in the data collection and assigned to principle 2. In conclusion, under this 'criterion' there are numerous different CARs with different aspects.

Criteria 2.5 and 2.6 have 12 and respectively 10 CARs. Criterion 2.5 is on offering job specific training and adequate supervision. Criterion 2.6 is on the ability of the company to compensate and resolve grievances. Therefore, succeeding the implementation of safety practices, these criteria are an important aspect in not complying with principle 2.

While Figure 8 shows which principle each country finds hard to fulfil, this type of data is best understood in its context. In the research done by Peña-Claros, Blommerde and Bongers (2009, p. 12) they concluded that local understanding is needed to interpret why these CARs exist in each country: "FMU in Brazil had more problems fulfilling the criteria "health and safety for employees and families", probably because the labors law in Brazil is very demanding, while FMU in Mexico had more problems fulfilling the chain of custody standards."

Conclusions on the basis of the number of CARs per principle could be two-folded. Firstly, an argument could be made for the fact that the auditors monitor more strictly for principle 2. Secondly, it could also be the case that indeed this principle is the hardest for FMUs to adhere to. Consistent implementation of wearing these safety equipment, gear and clothing was not common among the workers yet, according to statements by FSC employees.
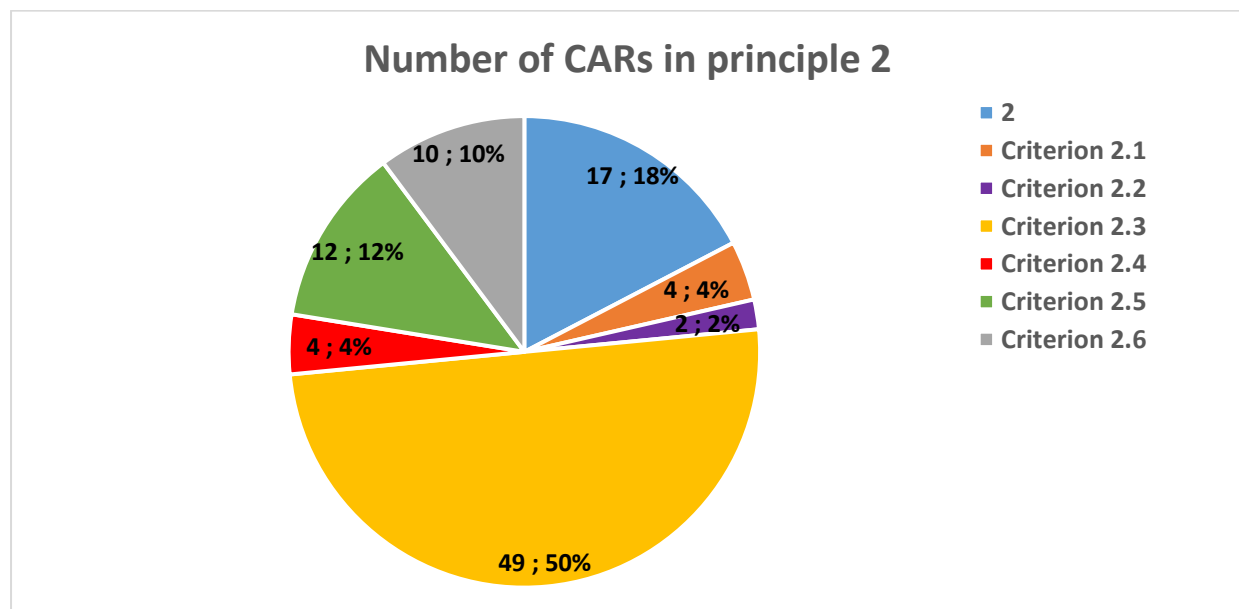


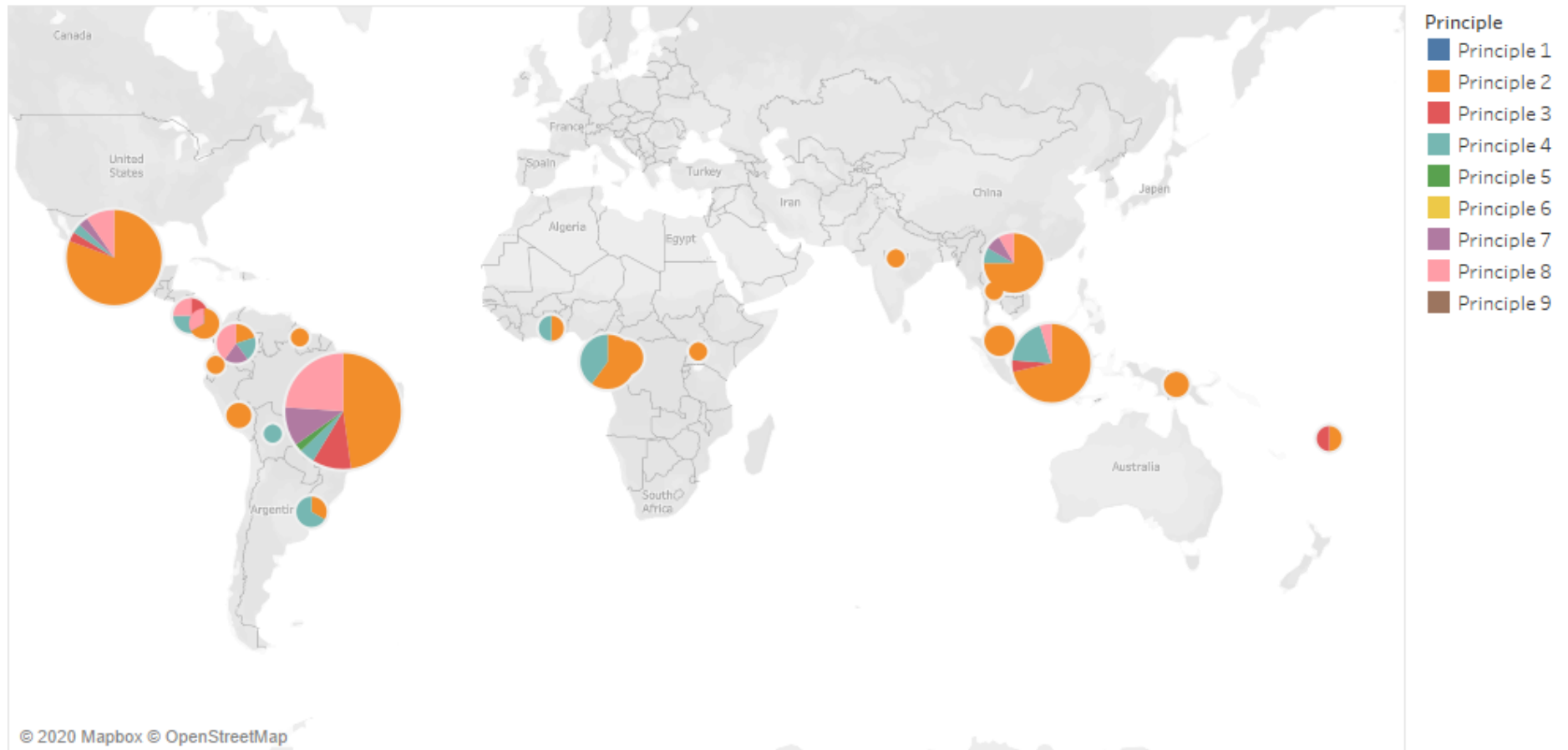Figure 7 Total number of CARs (and percentage) per criterion in principle 2

Figure 8 Map of all countries and their respective number of CARs (size) and its distribution (colours)

## Impact on a country level

When looking at Figure 9, it shows the score of each country that was reviewed in the audit analysis. This figure 'grades' each country: those that have no CARs grade a 10 out of 10. They show perfect compliance with the FSC guidelines on the social aspects. Those countries that have the most CARs perform the 'worst' in complying to the FSC standard, but still get at least a '5,5'. This means that they still have a pass. This can be explained by the fact that all FMUs should meet at least a minimum of requirements to obtain or keep their certificate. If they do not comply to this minimum, they will lose their certificate and therefore not be included in the sample nor 'population' of this analysis. Therefore, no countries are in the sample that do not have at least a 'pass'. The grades are calculated by first calculating the average number of CARs per certified FMU, afterward inversing these results and adding up 5,5 (as minimum grade). This results in a gradual scale starting with those countries without CARs (getting a '10') to the worst performing countries (getting a '5.5').

Furthermore, it should be noted that, even though some countries score a 5,5; this is only a comparison between other FSC certified FMUs. Scoring the worst among their co-certification-owners does not mean that they indeed have a low performance on the FSC social aspects. Due to lack of data that allows for comparison among non-certified FMUs, the comparison is made between FSC FMUs. Therefore, the grade per country is only illustrative for their relative performance compared to other FSC FMUs. This distribution is arbitrary, but it does show to what extent, relative to each other, the countries comply to the principles and criteria set by FSC.

With this data and sample, the conclusion can be drawn that Tanzania, Guatemala, Cameroon and Cambodia are the best performing countries: no CARs are given in their audit reports and therefore they comply to all the socially relevant criteria set by FSC. Regarding the data sensitivity, three of those countries only have one sample in the database and Guatemala has two. Once more, these results come from a sample of the database: other samples might give different results. For this reason, it proves relevant to further discuss countries that have four or more samples in the dataset. Those countries are: Brazil, Mexico, Thailand, Uruguay and Vietnam (for reference, see Table 10 in Appendix D).
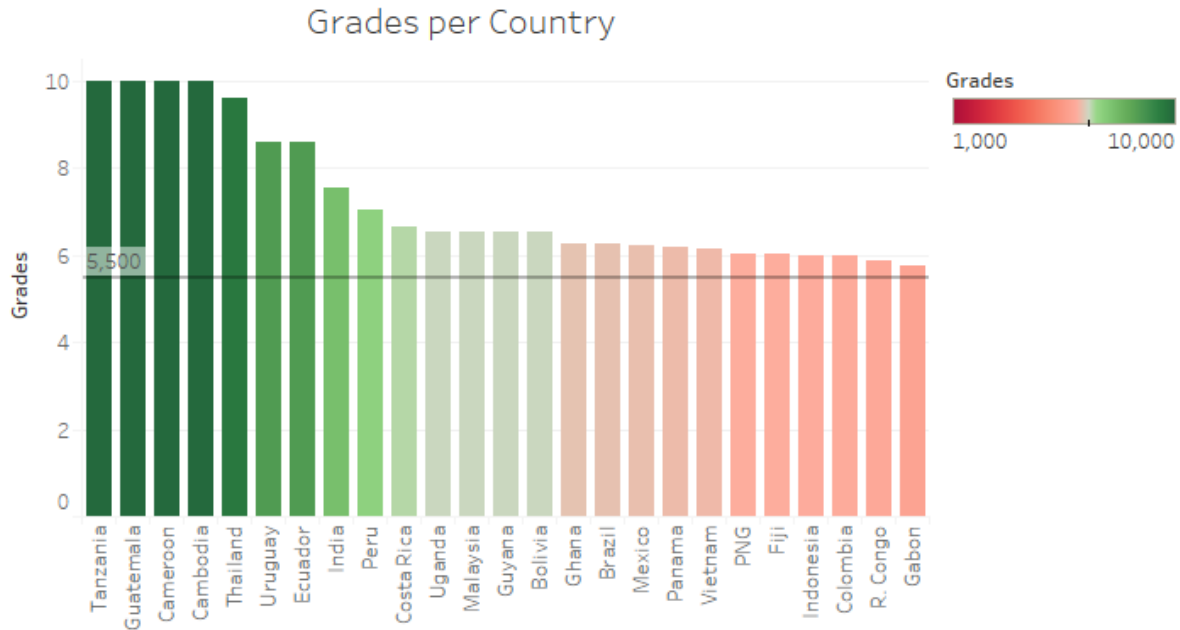
Figure 9 Grade per country

## Thailand and Uruguay

Of the six countries discussed, Thailand has the best grade. It even performs close to similar to the four countries that have no CARs at all with a 9,6 (see Table 10 in appendix D). Figure 8 shows that the one CAR (being a minor CAR) is in principle 2. Table 10 and Figure 12 also show that Thailand has very few CARs per certification (0,25). All in all, Thailand performs well.

Uruguay is similar to Thailand in its grade (8,6) and on its average CARs per certification (0,6). After Thailand, Uruguay is the second best of the countries discussed. Uruguay has 75% of its CARs in principle 4: the principle on community relations.

## Brazil, Mexico and Vietnam

Despite Brazil not having that much CARs per certification (1,7) (for reference see Figure 12 and Table 10 in appendix D), it performs average if you include the weighting (4,1) (see Figure 9, Figure 11 and Table 10 in appendix D). This is because Brazil has many minor CARs. When this is included in the analysis, it can be concluded that Brazil is among the least scoring countries. Looking at Figure 8, it also shows that half of the CARs are attributed to principle 2. Brazil showcases that they are, regarding division of principles and number (and weight) of CARs, similar to the worldwide average.

Mexico has 20 audit reports in the sample: there is much FSC activity there. Mexico resembles Brazil in its grade and has a 6,2. Compared to the other countries Mexico is performing below average (see Figure 9). This is mostly because they have on average more CARs per certification holder than other countries. More than 75% of the CARs are in principles 2 (see Figure 8). Vietnam performs worse than Brazil and Mexico, with a grade of 6,2, and is in the lower regions of the figure. Over 80% of the CARs are in principle 2 and it has a high average number of CARs per certification.

*Indonesia*

Indonesia, with 8 certification holders that were reviewed in this sample, performs worse of these six countries. The average number of CARs per certification is among the highest (2,63) (for reference, see Table 10 in appendix D) and when weight is included it scores as one of the worst countries among those certified (6,38) (for reference, see Table 10 in appendix D). It should be noted that despite this high number of CARs, relative to the other FMUs, it still adheres sufficiently to the FSC criteria, according to the auditors. Despite being the worst among these countries, they still qualify for a sufficient grade. Most of the CARs were on principle 2.

*Regional*

The data above were clustered per country. When looking at the data per region and including all the data from the sample, conclusions can be given on which region performs better than other regions. Figure 10 shows that Central and South-America perform best, but moreover that there is no big difference in grade between the regions. Once again, this shows how little certificates are in Africa in this sample.
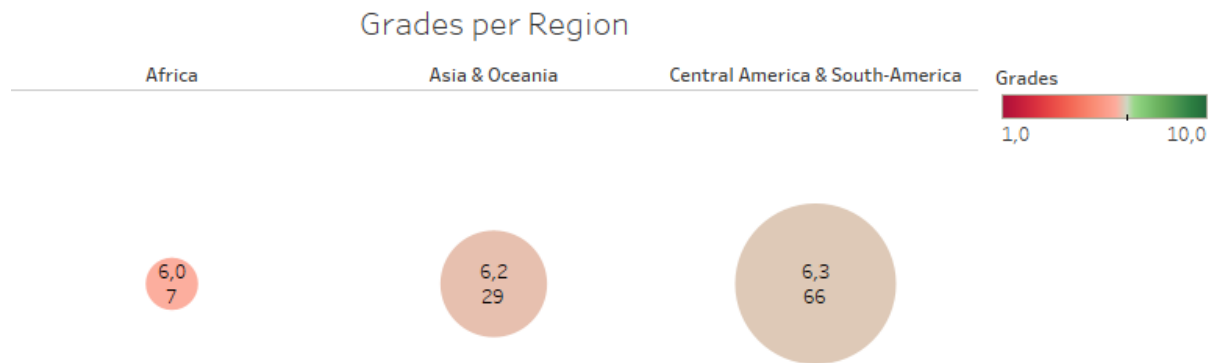


Figure 10 Average grade per region & Number of certificates per region

## Average CARs (with weight) per Country

Avg CARs (weight)

0,75    13,00

© 2020 Mapbox © OpenStreetMap

Figure 11 Average CARs (with weight) per certified FMY per country

Figure 12 Average CARs per certified FMU per country

## Employees and worker's safety

With regards to social impact, it might prove relevant to see how much people the companies employ and to conclude on the gender balance in FSC tropical timber companies. Furthermore, the number of accidents will be highlighted.

### Employees

In total 32.670 people are employed by the FSC tropical timber countries, both seasonal and permanent employees. This could be extrapolated to 156.017 employees for all the 487 certified FMUs in the countries where tropical timber is harvested, as an estimation. The certificate companies have mostly male employees. On a regional level at least 78% of the employees are male, see Figure 13. Furthermore, in Africa, the least number of people are employed whilst they also have the least number of certification holders. Of these employees 91% are men (Figure 13). In Asia and Oceania 9.684 number of people are employed and 78% of them are men, being the best in gender balance among the FSC tropical timber regions. In Central and South America, the greatest number of people are employed (20.367), but they also have the greatest number of FMUs. Of those employees 92% are men.

Additionally, while consistent data on salary could not be found in the audit reports, the study by Cerutti et al. (2014) found that 57% of certified companies offered higher salaries than the forest sector in different countries.

### Accidents

Figure 14 and Table 11 (for reference, see appendix D) show the total percentage of accidents per employee per country. Once more, it should be taken into consideration that these data are a snapshot of the situation in 2019. With 6,6% accidents per employee Cameroon has the highest percentage of accidents, followed by Colombia (4,6%), Gabon (3,2%), Peru (1,9%) and Costa Rica (1,9%). The other countries that have accidents have around 0,5% or lower. It should also be noted that 14 out of 25 countries do not have any accidents. A conclusion is that there is a the statistically significant higher chance of accidents in Cameroon than the other countries (validated with a chi-square test). The same conclusion applies to Colombia and Gabon.

Three countries have fatal accidents: Mexico and R. Congo both have one fatal accidents and Indonesia has 2 in 2019. R. Congo, however, has a higher percentage of fatal accidents per employee. Overall Asia and Oceania show the lowest percentage of accidents of the three regions.

### FSC Standard vs national standard

Some of the criteria set by FSC for their standard prove to be relevant indicators of the social impact of FSC compared to national averages. When no CARs are reported on these indicators, it could be said that all tropical timber FMUs certified by FSC obtain at least this level of social impact. These are relevant to highlight to showcase where FSC outperforms the national standards.

For example, indicator 2.4.1 states: "Wages paid by The Organization in all circumstances meet or exceed legal minimum wage rates, where such rates exist." In the dataset that was extracted; no CARs were found on this indicator.

Furthermore, indicator 2.3.5 states: "The frequency and severity of accidents are consistently low compared to national forest industry averages". In the dataset, no CARs were found on this indicator

either. Therefore, despite the number of (fatal) accidents reported, it can be concluded that this at least underperforms the national average of the forest industry.

When talking about gender division, it was clear that FSC companies employ more men than women. However, indicator 2.2.4 had no CARs in this dataset. Meaning women and men are at least paid the same wage whenever they perform the same work.

## Division Male and Female Employees per Region

Region (group)

| Africa | Asia & Oceania | Central America & South-America |

8,48%   21,10%   7,29%
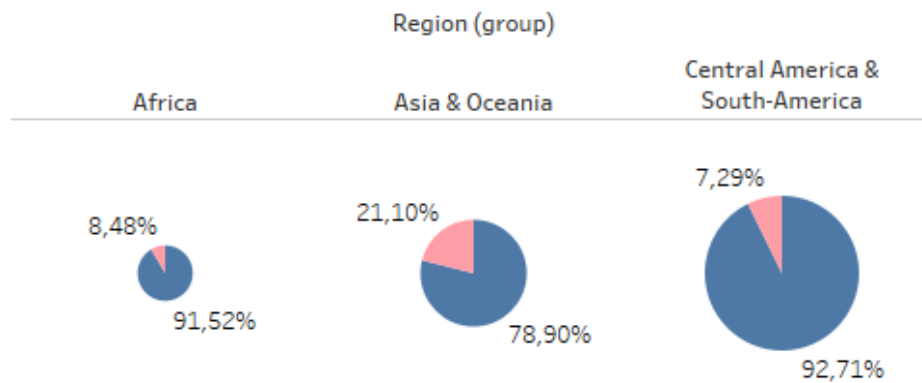
91,52%   78,90%   92,71%

Figure 13 Gender balance and number of employees per region

Percentage of accidents per worker per country

Map based on Longitude (generated) and Latitude (generated). Color shows (SUM([Number of accidents])/SUM([Workers]))*100. Details are shown for Country. The data is filtered on Done, which keeps X.

Figure 14 Percentage of accidents per employee per country

## In conclusion

What this chapter tried to illustrate is to what extent FSC FMUs are able to comply with the FSC criteria. This approach is chosen because no data could be found to compare how certified forestry is doing against other forestry types. The social impact could be said to be everything that FSC intends to have, except for those aspects and criteria where it is proven by CARs these criteria are not met.

When using Cerutti et al (2014) as point of departure, the conclusions of the CAR-analysis can be put in context. They did research on whether "the presence of an FSC certificate has had a positive impact on the working and living conditions of employees and their families" (Cerutti et al., 2014, p. 9). In short, they concluded that the (long term) presence of FSC certification had a more positive social effect than non-certified FMUs and that better working and living conditions for workers and families could be found. As Cerutti et al. (2014, p. 47) put it: "Results indicate that certification can be significantly associated with better social performance." Therefore, if the FSC standard and its criteria is the bar for improved social impact, it might be stated that complying to these criteria is indicative for improved social impact as well. The results of this analysis showed that many of the principles and criteria in various countries are met. To a certain extent the FMU do illustrate in this way that improved social impact is achieved, in comparison to non-certified FMUs.

Nonetheless, the same research also suggest that it is still not conclusive that positive improvements of social (and ecological) impact can solely be attributed to certification (Cerutti et al., 2014). Other external processes, like legal frameworks, could play a part. Dasgupta and Burivalova (2017) even suggest that better performance can be traced back to forest managers that care about the forest and consequently get certified, this being a better indicator for where performance improvements originate. In conclusion, attribution of the discussed results to certification itself cannot be guaranteed.

# Conclusion and Discussion

In the following section, the results will be discussed, interpreted and related back to the research question. With this, an answer to the research question will be given. Furthermore, a discussion will follow on the implementations and limitations of this research. This section ends with recommendations for further research and FSC.

## Conclusions and interpretations

In this exploratory research, monetisation models for social impact of the forestry sector and in particular the FSC certification scheme were explored. The research question central to this research was:

*What data and indicators are required to construct a model for monetising social impact of FSC tropical timber?*

This research was done in order to contribute to discussion on internalising externalities by studying different ways in which social impact can be demonstrated. Furthermore, the research tries to contribute to the discussion on social impact and ways in which this could be measured as well as assessing what the current state is regarding data availability and social impact models. In order to answer the research question, the results of sub questions will be briefly addressed.

### Social impact and indicators

Defining social impact was needed first to address the research question. In the scientific literature social impact is mostly used as an umbrella term, however, there is always a focus on local population. The social impact is defined as a change in population's or community's well-being due to actions by an entity. Furthermore, more recently, social impact also included the positive and intended consequences.

For FSC, social impact is one of their three pillars. The core values for the standards that they set out is in their 'Principles and Criteria'. In here it can be concluded that the local community and the workers are the main target group of this social pillar. In the ToC they mention that the intended social impact is within three areas: maintaining good relationships with local communities, improving their livelihood, and improving the living and working conditions of workers.

The standard 'Principle and Criteria' is drafted by all members of FSC, making it a true reflection of how social impact should be made and measured. This standard is used by audit bodies to verify whether certified FMUs adhere to the FSC rules and thus their intended social impact.

However, the question arises whether these final audit indicators are able to measure the social impact FSC pursues. The essence of the intended social impact is diminished to mere indicators used as a checklist for audits. Islam, Deegan, and Gray (2015) also address the fact that the interpreter of the social audit reports should remain critical on the legitimacy of the audit results being a reflection of the real social context. Therefore, it is important to remain critical towards indicators when using them in assessing the effectiveness of social impact.

## Models

Certified wood has additional value over regular wood, among other things due to a higher social equity. Therefore, a reflection of this externality in the (monetary) value of wood could create a solution (Dascalu et al., 2010). Especially since Marx and Cuypers (2010) argue that deforestation driven by agriculture cannot be addressed by certification until timber contains enough market value. Internalising the (positive social) externalities can therefore help stimulate the consumption of certified wood (Bray et al., 2011). Using a model to analyse the social impact can be a first step in valuing certified timber.

Monetisation is one way to account for social impact, transforming the externality into a monetary value. Monetisation has as advantage that the results are expressed in a monetary value that is easily understood and instinctively compared by consumers (Morel et al., 2018). However, for the forestry sector, no monetisation model exists yet.

In addressing the search for social impact models, several criteria were relevant: reproducibility, relevant for social impact modelling, and quantitative or monetisable results. Few applicable models were found in the literature search. Most of the models that were found were almost all in a beginning stage.

The following models were considered because of their monetisation potential or quantitative prospect: S-LCA, S-Eco-Cost and the successor ESCU, (Societal) Life Cycle Costing and CAR-analysis. Reasons for all, but one, to be dismissed were requirement of detailed accounts and data of supply chain, lack of comparable data or non-suitability for the forestry sector.

The CAR-analysis by Peña-Claros et al. (2009) claim to assess the impact of certification by analysing audit reports. Whilst on-the-ground studies are time consuming and costly, the CAR-analysis provides an indirect way of measuring the impact of certification. In conclusion, this proves to be the most specific model among the ones studied, but also the best fit for this research objective.

## Data

Succeeding the preceding insights, an account of the relevant social impact categories was made. The data that were needed had to be local and context specific: in this way social impact could be assessed. The impact categories were both based on principles of FSC and conclusions drawn from expert literature. The following impact categories were considered when looking for social data:

- Employment
- Wage Assessment
- Safety Conditions
- Labour Rights
- Quality of Housing
- Access to Health Care
- Access to (Improved) Drinking Water
- Access to Education

Subsequently, the data(banks) were systematically reviewed, from macro to meso level. It was concluded that public data (banks) proved irrelevant due to its generalisability. NRA did not provide quantitative (social) data and were mostly anecdotal evidence. However, audit reports had the advantage of public availability, consistency, currentness and provision of social data.

As audit reports are written by third-party audit bodies, the objectivity and therefore the validity is enhanced. The data that are available in audit reports are (i.a.) number of employees and number of accidents. Moreover, in the audit reports noncompliance with the FSC standard is indicated. This is done by assigning CARs, being the most relevant data input for analysing the social impact. Impact analysis on the basis of CARs is an indirect impact measurement (Peña-Claros et al., 2009); because these are procedural criteria on the forest management rather than actual forest management practices. The effect that is measured is, consequently, also indirect.

The nonexistence of (social) databases on social aspects in the forestry sector, is the data gap and therefore answers part of the research question on what data is needed for monetisation models. While data on the social impact of forestry practice is needed, this is not yet available. Furthermore, with CARs and audit reports being the only data available that were found in this research, information and data on the other discussed impact categories are lacking. Only data on two (employment and safety condition) of the nine impact categories can be provided by this data source.

The literature (Benoit-Norris et al., 2012; Benoît Norris, 2014; Cerutti et al., 2014; Velden & Vogtländer, 2017) also agrees that in order for social impact to be assessed, data necessary to do so are data like those addressed in the impact categories: number of schools built, wage for employees, hospitals that are built, data on safety of workers and more. Cerutti et al. (2014, p. VI) likewise show that these data are indeed lacking and that the studies show conflicting results: "Although the FSC standard has a strong social component that seeks to improve relationships between logging companies and local populations and contributes significantly to local development, social impacts are under-researched, and the existing literature shows conflicting results."

In reference to the research question, which inquires which indicators are required for models on monetization, together with the results of sub-question 1, 3 and the analysis in sub-question 4, some absent indicators can be formulated from the social impact categories that are missing. There is a need of indicators on access to health care, access to education, wage and quality of housing. This is needed in order to have a more complete assessment of the impact a certification scheme has on the community. Furthermore, these indicators will complement the existing indicators and data, elaborated on in the next paragraph.

## Data-analysis

At last, to test the chosen model and data source, and to answer the research question, the social impact of FSC-certified tropical timber was assessed. This was done by analysing to what extent the certified FMUs are able to comply to the FSC criteria, using a CAR-analysis. When full compliance was observed, FSC's intended social impact were realised.

The results of the CAR-analysis are a snapshot and only illustrative for how the certified FMUs perform in 2019. The data show which FSC principle proves the hardest to comply with by the certification owners. For each principle the compliance rate was presented: it can be concluded that principle 2 has the most CARs and the lowest compliance rate. This principle is themed 'Workers' right and employment conditions'.

Within principle 2, the most CARs were issued on situations concerning (the lack of) safety practices. FSC employees and experts in the field confirm that consistent implementation of wearing these safety equipment, gear and clothing was not common among the workers yet. One might conclude that FSC, since they provide more safety equipment than non-certified FMUs do (Cerutti et al., 2014), seems to have some difficulties in enforcing workers to wear appropriate safety equipment.

In the study done by Karmann and Smith (2009, p. 33), the improvement resulting from following these criteria is well illustrated: "FSC certification has led to an improvement across all six countries in the implementation of health and safety legislation, including the provision of better equipment and training, the use of safety procedures, and the reliance on properly qualified forest workers. (…) FSC certification has improved the social conditions for forest workers. The employment of the local people has been favored, formal job training has increased and it has also led to better compliance with social & legal requirements."

In addition, on a country level, the different countries were graded on compliance to the FSC criteria and principles. This provided a comparison between the certified FMUs in these countries in the sample. Tanzania, Guatemala, Cameroon and Cambodia are the best performing countries: no CARs were issued in these countries. When looking at the countries that had four or more certified FMUs in the sample, Thailand had the best grade and Indonesia performed worst. When the comparison is made on a regional/continental level, it looks like the difference are small. Central and South-America perform best, while Africa performs worst in adhering to FSC's principles.

In the sample, 32.670 people are employed by the certified FMUs and most of these (at least 76% on a regional level) are male. In comparison, Cerutti et al. (2014) show the gender balance among FSC certified and non-certified FMUs: both certified and non-certified FMUs have a high percentage of male employees (approximately 98%). The data from this analysis differ from the research by Cerutti et al. Furthermore, the study done by Dasgupta and Burivalova (2017) endorse the finding that there is indeed a gender imbalance. This is not a remarkable finding, however, since most of the workers are loggers and logging is a physically strenuous activity.

Furthermore, the number of accidents was also compared. Most notably, 14 out of 25 countries in the sample did not report any accidents. Out of the countries in which accidents were reported, Cameroon had a notable number of accidents with a relative 6,6 accidents per 100 employees. However, an important conclusion can be drawn from the fact that no CARs were reported on indicator 2.3.5. This means that the frequency and severity of accidents are consistently low compared to national forest industry averages, and all certified FMUs complied to this indicator.

While these data in itself do not provide much context, Ackerknecht, Bassaber, Reyes and Miranda (2005, p. 153) illustrate that after implementation of FSC "(…) most companies showed there were improvements in accident rate, risk rate, and average time lost per accident. For most companies implementation of (…) Forest Stewardship Council requirements helped to increase competitiveness by improving safety indicators in a statistically significant way." While the data from this analysis cannot confirm this improvement in these FMUs as well, it is indicative for the idea that these accident rates could be lower than non-certified FMUs.

In addition, Breukink, Levin and Mo (2015, p. 22) show similar results: "Companies reported reductions in accidents and safety incidents, ranging from major to minor improvements. Company management staff attributed the improvement in worker safety to several factors associated with FSC certification, including better safety gear and equipment, changes in corporate culture, and an increase in awareness among logging employees."

## In conclusion

This research tried to assess what data and indicators are required to construct a model for monetising social impact of FSC tropical timber. The research question could not be answered in full, due to limitations addressed in the previous sections. The results indicate that no model is yet fit for monetising social impact in the forestry sector. Furthermore, while the indicators are readily available, little data are available to make a proper assessment of the social impact by FSC. However, this research did provide a CAR-analysis in order to test whether an assessment on the basis of audit

reports was possible. This resulted in valuable insights of how certified FMUs are performing regarding FSC's intended social impact.

## Theoretical implications

### Monetisation models

This research showed that implementation of current models to monetise social impact in forestry is not yet possible. As Velden and Vogtländer (2017) show, a model on monetisation is possible. Their case was designated for the apparel sector. Nonetheless, this research is still in its preliminary phase.

Research on the development of LCA and S-LCA show that it took a long time for the need for social assessments of life cycles to arise. S-LCA is still developing, since its origin in the 90's (UNEP Setac Life Cycle Initiative, 2009). This is illustrative for the timeframe it takes for a model to be fully implementable. However, the literature shows a growing need for monetisation models, as discussed. This is particularly relevant when regarding the internalisation of externalities and reflecting a true price for a product. This might suggest that in years to come, monetisation models are widely available. The first possibilities (though in preliminary phases) are already out there.

This research was explorative and tried to assess the current state of the models available and their applicability to a specific case. By pinpointing the data gaps as well, it tried to outline what, at the moment, is lacking, for proper monetary social impact assessments to take place. Thereby contributing to the ongoing scientific discussion on the need to "accelerate further development of the S-LCA method, for hotspot analyses and benchmarking of unsustainable production chains." (Velden & Vogtländer, 2017, p. 328)

### Data and further research

Regarding the data availability, this research provided the data gaps for the forestry sector for proper social impact assessments. These data gaps are the direct social data in the forestry sector for impact categories such as access to health care, quality of housing and access to education. All academic literature on impact of the forestry sector that have been discussed in this research are case studies. Therefore, a lack of more general studies has been identified, giving an overview of the impact of the forestry sector. A general agreement by the authors is that the scientific literature on the impact of FSC is currently poor (Dasgupta & Burivalova, 2017).

Vanclay (2002) also addresses that, when social impact is assessed, the significance of the results is highly context specific. "[whether] social impacts [are] likely to be significant will vary from place to place, from project to project, and the weighting assigned to each social impact will vary from community to community." (Vanclay, 2002, p. 184) This is in turn a call for more local data.

While these data are called for in the scientific literature, this research addressed the data gap but moreover also the potential data sources that could be used for further impact assessments. One of these sources might be a database by FSC from data that is given by the certification holders itself. They possess knowledge and data (both qualitative and quantitative) on the way they effect the local community. This knowledge is valuable. Furthermore, data on a national level for the forestry sector proves useful. At present, data is lacking on, for example, the number of employees in this sector and the number of national accidents. When these sources of information are available, a practical implementation for the scientific community is given as a steppingstone.

### CAR-analysis as possibility

The CAR-analysis provided a practical comparison with the previous study by Peña-Claros et al (2009). The results of this research agree to a certain extent with findings by Peña-Claros et al.. These researchers also pointed out that criteria on health and safety for employees and families, and on management plans were those that the most CARs were attributed to. The current dataset and theirs have a 10-year time difference between them. These are important findings, suggesting that throughout time the certified FMUs still have a hard time complying to the safety standards set by FSC.

Furthermore, Peña-Claros et al. (2009) made the same observation regarding criteria on the indigenous people: coming to an understanding and agreement with indigenous people hardly proved an issue. The same results are observed in the analysis of this thesis, because principle 3 (on the right of indigenous people) had a relatively low number of CARs. Peña-Claros et al. (2009, p. 55) also provide an explanation for this phenomenon: "Moreover it is actually interesting that several social criteria (mostly related to indigenous people) are not included among the most common issues raised in our sample (…), suggesting that managers of FMU are dealing with these issues in a satisfactory way before undergoing the certification process, that these issues are not really a problem in the tropics, or that the evaluation team, regardless of their efforts, is not being able to identify these issues as a problem during the evaluation process." This is illustrative for the fact that the results show similarities, and at the same time the justifications of these findings 'in the tropics' can be parallel as well. This enhances the validity of this approach, because the findings in this thesis validate that this model yields coherent results.

Most of the results from this thesis agree with research already done by Peña-Claros et al. (2009), despite it being executed a decade after their study. More importantly, considering the constrains and limitations of model and data availability, the reproduction of this approach could prove other authors on social impact the real possibilities of using CAR-analysis as an impact assessment tool.

## Limitations

While doing this research, the author was well aware of the limitations of this research. It is important to remain critical on the way the research is carried out and on the results. Every study has its limitations and in this section some of the limitations are discussed.

### Literature review

Literature review formed an essential part in addressing the research questions. The literature review provides a snapshot of the data currently available and might not be complete. However, given the scope of this research, this can be justified. It is impossible to find all the literature that, for example, contains the social impact models central for this research.

The author exerted himself to review the available literature to the best of his ability. The amount of time that was put into the literature search as well as the use of snowball technique, made sure that the best coverage possible of literature was strived for within this scope of research. The same is true for the extensive literature and internet search for (social) databases.

### CARs as source

Since using audit reports and performing CAR-analysis is sensitive to inaccuracies, several considerations need to be taken into account.

First of all, the collection of CARs from the audit report relied on the author's judgement. The indicators were provided by the international document of the 'Principles and Criteria' from FSC, but the content of the audit reports differed per country. Each country has its own interpretation of what is relevant for that country, refining an own version of the FSC standard. This is also important in order to understand possible differences between countries. During the CAR extraction from the audit reports, the CARs were assigned to the relative indicator from the international standard, while the CARs by the auditor were appointed to indicators on the national standard. Therefor the author judged which respective (international) indicator was appropriate for each CAR. In a systematic review double data extraction would have been done, however this is outside the scope of this research.

The other side of the same coin is the trustworthiness of the auditors when performing the audit. Total objectivity cannot be guaranteed and the certainty that all noncompliance by the FMU are covered in the audit report cannot be given. Difference in results by different audit bodies could be explained in this way. In conclusion, the apparent performance of the FMU and the reliability of audit reports as objective data source are in the hands of the auditors. This is confirmed by Cerutti et al. (2014, p. 42) "Some rightly argue that (…),too much power is still left in the hands of (subjective) auditors".

Furthermore, certifications are withdrawn when Major CARs are not corrected by the FMU, which explains the relatively few amounts of Majors CARs in the data. Consequently, by leaving these certifications (and their audit reports) out of the FSC database, negative 'cases' (which in themselves can be very informative) disappear from the data and a more positive representation of the status of the forests (and their respective social community) is given. This distorts the data on the impact of FSC to the advantage of FSC, which could be compared to false negative error.

Lastly, it is known that the studying social impact and communities is a complex reality. It is naïve to believe that this complexity could be captured in a checklist that auditors fill out. Although it is an efficient assessment, the results should be interpreted and used with care. Vanclay (Vanclay, 2002, p. 184) affirms this once more: "There are many arguments against the development of a checklist. At worst, a checklist would mean that charlatan consultants—those with little training in the social sciences […]—may use the checklist instead of undertaking a proper scoping process. They may just use so-called 'expert judgements' to specify likely impacts rather than undertaking field work or involving the public in determining locally important issues. In the process of specifying impacts, consultants using a checklist approach may not properly think through the complex causal mechanisms that produce social impacts."

## Recommendations

### Development of monetisation models

Part of the reason that the research question could only be partly answered, is because most of the relevant monetisation models are still in its infancy stage and are at the moment mere theoretical elaboration in the scientific community only. Further research in this field is needed to establish usable monetisation tools for practical use and accessibility to the consumers. This is an important step in the discussion on internalising externalities.

### More data

One of the main recommendations for both the scientific community as well as certification schemes and certified companies is to make more data available. This could be done either through more (case) studies and applying a homogenous framework of data reporting, so as to make comparison uncomplicated. Another approach, which is highly recommended by the author, could be that certification schemes (such as FSC) or the companies gather their data in a publicly available database. Data like the number of jobs created, the wage for employees, accessibility to health care for the community and number of schools built are known, but it neither recorded nor publicly available. Empirical studies demonstrate that FSC does have impact, however without data this is hardly tangible other than small-scale and local case studies. Without public databases available, it is harder for the scientific communities and certification schemes itself to get insight in how they impact the community.

### Abilities for comparison

Furthermore, when relevant information should be given on the social impact, it is helpful to have a frame of reference. Especially when attribution of (improved) social impact should be assigned to a certification scheme, other data that could work as a benchmark is preferred. No comparable data could be found for this research, however data on for the (non-certified) forestry sector might come in useful. Cerutti et al. (2014, p. 48) also advocates for similar comparable information: "In this respect, we suggest the establishment of social baselines against which certifying bodies, companies and consumers could monitor changes in social conditions towards a commonly agreed improved situation."

## To conclude

While this research mostly concludes that current models do not all suffice to measure social impact as a mean to enhance the value of timber that is sustainably managed, this research is also an encouragement for the scientific community as well as certification schemes to keep on developing ways to do so.

In the end, it will benefit not only the forests, but in turn also the global community (by tackling climate change), biodiversity and more importantly the local people that are dependent on the forest. Whether evidence is present or not, choosing sustainably will make an impact.

*"What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another."*

*Mahatma Gandhi*

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# Appendices

## Appendix A - List of countries

| Nr. | Country |
| --- | --- |
| 1. | Bolivia |
| 2. | Brazil |
| 3. | Cambodia |
| 4. | Cameroon |
| 5. | Colombia |
| 6. | Costa Rica |
| 7. | Ecuador |
| 8. | Fiji |
| 9. | Gabon |
| 10. | Ghana |
| 11. | Guatemala |
| 12. | Guyana |
| 13. | Honduras |
| 14. | India |
| 15. | Indonesia |
| 16. | Malaysia |
| 17. | Mexico |
| 18. | Mozambique |
| 19. | Panama |
| 20. | Peru |
| 21. | PNG |
| 22. | Republic of Congo |
| 23. | Suriname |
| 24. | Tanzania |
| 25. | Thailand |
| 26. | Uganda |
| 27. | Uruguay |
| 28. | Vietnam |

Table 7 List of countries where tropical timber is potentially harvested under license of FSC

## Appendix B - Selection of social impact principles, criterion and indicators from the FSC standard

| Number | Category | Description |
|---|---|---|
| *1.6* | Criterion | The Organization shall identify, prevent and resolve disputes over issues of statutory or customary law, which can be settled out of court in a timely manner, through engagement with affected stakeholders. |
| 1.6.1 | *Indicator* | *A publically available dispute resolution process is in place; developed through culturally appropriate engagement with affected stakeholders.* |
| 1.6.2 | *Indicator* | *Disputes related to issues of applicable laws or customary law that can be settled out of court are responded to in a timely manner, and are either resolved or are in the dispute resolution process.* |
| 1.6.3 | *Indicator* | *Up to date records of disputes related to issues of applicable laws or customary law, are held including:*<br>*1) Steps taken to resolve disputes;*<br>*2) Outcomes of all dispute resolution processes; and*<br>*3) Unresolved disputes, the reasons they are not resolved, and how they will be resolved.* |
| 1.6.4 | *Indicator* | *Operations cease in areas where disputes exist:*<br>*1) Of substantial magnitude; or*<br>*2) Of substantial duration; or*<br>*3) Involving a significant number of interests.* |
| *2* | **Principle** | **Workers Rights and Employment Conditions - The Organization shall maintain or enhance the social and economic wellbeing of workers.** |
| *2.1* | Criterion | The Organization shall uphold the principles and rights at work as defined in the ILO Declaration on Fundamental Principles and Rights at Work (1998) based on the eight ILO Core Labour Conventions. |
| 2.1.1 | *Indicator* | *Employment practices and conditions for workers demonstrate conformity with or uphold the principles and rights of work addressed in the eight ILO Core Labour Conventions as defined in the ILO Declaration on Fundamental Principles and Rights at Work (1998).* |
| 2.1.2 | *Indicator* | *Workers are able to establish or join labour organizations of their own choosing subject only to the rules of the labour organization concerned.* |
| 2.1.3 | *Indicator* | *Agreements are implemented resulting from collective bargaining with formal and informal workers organizations.* |
| *2.2* | Criterion | The Organization shall promote gender equality in employment practices, training opportunities, awarding of contracts, processes of engagement and management activities. |
| 2.2.1 | *Indicator* | *Systems are implemented that promote gender equality and prevent gender discrimination in employment practices, training opportunities, awarding of contracts, processes of engagement and management activities.* |
| 2.2.2 | *Indicator* | *Job opportunities are open to both women and men under the same conditions, and women are encouraged to participate actively in all levels of employment.* |
| 2.2.3 | *Indicator* | *Work typically carried out by women (nurseries, silviculture, Non Timber Forest Product harvesting, weighing, packing, etc.) is included in training and health & safety programs to the same extent as work typically carried out by men.* |
| 2.2.4 | *Indicator* | *Women and men are paid the same wage when they do the same work.* |

| | | |
|---|---|---|
| 2.2.5 | *Indicator* | *Women are paid directly and using mutually agreed methods (e.g. direct bank transfer, direct payments for school fees, etc.) to ensure they safely receive and retain their wages.* |
| 2.2.6 | *Indicator* | *Maternity leave is no less than a six-week period after childbirth.* |
| 2.2.7 | *Indicator* | *Paternity leave is available and there is no penalty for taking it.* |
| 2.2.8 | *Indicator* | *Meetings, management committees and decision-making forums are organized to include women and men, and to facilitate the active participation of both.* |
| 2.2.9 | *Indicator* | *Confidential and effective mechanisms exist for reporting and eliminating cases of sexual harassment and discrimination based on gender, marital status, parenthood or sexual orientation.* |
| *2.3* | Criterion | The Organization shall implement health and safety practices to protect workers from occupational safety and health hazards. These practices shall, proportionate to scale, intensity and risk of management activities, meet or exceed the recommendations of the ILO Code of Practice on Safety and Health in Forestry Work. |
| 2.3.1 | *Indicator* | *Health and safety practices are developed and implemented that meet or exceed the ILO Code of Practice on Safety and Health in Forestry Work.* |
| 2.3.2 | *Indicator* | *Workers have personal protective equipment appropriate to their assigned tasks.* |
| 2.3.3 | *Indicator* | *Use of personal protective equipment is enforced.* |
| 2.3.4 | *Indicator* | *Records are kept on health and safety practices including accident rates and lost time to accidents.* |
| 2.3.5 | *Indicator* | *The frequency and severity of accidents are consistently low compared to national forest industry averages.* |
| 2.3.6 | *Indicator* | *The health and safety practices are reviewed and revised as required after major incidents or accidents.* |
| *2.4* | Criterion | The Organization shall pay wages that meet or exceed minimum forest industry standards or other recognized forest industry wage agreements or living wages, where these are higher than the legal minimum wages. When none of these exist, The Organization shall through engagement with workers develop mechanisms for determining living wages. |
| 2.4.1 | *Indicator* | *Wages paid by The Organization in all circumstances meet or exceed legal minimum wage rates, where such rates exist.* |
| 2.4.2 | *Indicator* | *Wages paid meet or exceed:*<br>*1) Minimum forest industry standards; or*<br>*2) Other recognized forest industry wage agreements; or*<br>*3) Living wages that are higher than legal minimum wages.* |
| 2.4.3 | *Indicator* | *When no minimum wage levels exist, wages are established through culturally appropriate engagement with workers and/or formal and informal workers organizations.* |
| 2.4.4 | *Indicator* | *Wages, salaries and contracts are paid on time.* |
| *2.5* | Criterion | The Organization shall demonstrate that workers have job-specific training and supervision to safely and effectively implement the management plan and all management activities. |
| 2.5.1 | *Indicator* | *Workers have job specific training consistent with Annex B and supervision to safely and effectively contribute to the implementation of the management plan and all management activities.* |
| 2.5.2 | *Indicator* | *Up to date training records are kept for all relevant workers.* |
| *2.6* | Criterion | The Organization through engagement with workers shall have mechanisms for resolving grievances and for providing fair compensation to workers for |

| | | loss or damage to property, occupational diseases, or occupational injuries sustained while working for The Organization. |
|---|---|---|
| 2.6.1 | *Indicator* | *A dispute resolution process is in place, developed through culturally appropriate engagement with workers.* |
| 2.6.2 | *Indicator* | *Workers grievances are identified and responded to and are either resolved or are in the dispute resolution process.* |
| 2.6.3 | *Indicator* | *Up-to-date records of workers grievances related to workers loss or damage of property, occupational diseases or injuries are maintained including:*<br>*1) Steps taken to resolve grievances;*<br>*2) Outcomes of all dispute resolution processes including fair compensation; and*<br>*3) Unresolved disputes, the reasons they are not resolved, and how they will be resolved.* |
| 2.6.4 | *Indicator* | *Fair compensation is provided to workers for work-related loss or damage of property and occupational disease or injuries.* |
| *3* | **Principle** | **Indigenous Peoples' Rights - The Organization shall identify and uphold Indigenous Peoples' legal and customary rights of ownership, use and management of land, territories and resources affected by management activities.** |
| *3.1* | Criterion | The Organization shall identify the Indigenous Peoples that exist within the Management Unit or are affected by management activities. The Organization shall then, through engagement with these Indigenous Peoples, identify their rights of tenure, their rights of access to and use of forest resources and ecosystem services, their customary rights and legal rights and obligations, that apply within the Management Unit. The Organization shall also identify areas where these rights are contested. |
| 3.1.1 | *Indicator* | *Indigenous Peoples that may be affected by management activities are identified.* |
| 3.1.2 | *Indicator* | *Through culturally appropriate engagement with the Indigenous Peoples identified in 3.1.1, the following issues are documented and/or mapped:*<br>*1) Their legal and customary rights of tenure;*<br>*2) Their legal and customary access to, and use rights, of the forest resources and ecosystem services;*<br>*3) Their legal and customary rights and obligations that apply;*<br>*4) The evidence supporting these rights and obligations;*<br>*5) Areas where rights are contested between Indigenous Peoples, governments and/or others;*<br>*6) Summary of the means by which the legal and customary rights and contested rights, are addressed by The Organization;*<br>*7) The aspirations and goals of Indigenous Peoples related to management activities.* |
| *3.2* | Criterion | The Organization shall recognize and uphold the legal and customary rights of Indigenous Peoples to maintain control over management activities within or related to the Management Unit to the extent necessary to protect their rights, resources and lands and territories. Delegation by Indigenous Peoples of control over management activities to third parties requires Free, Prior and Informed Consent. |
| 3.2.1 | *Indicator* | *Through culturally appropriate engagement Indigenous Peoples are informed when, where and how they can comment on and request modification to management activities to the extent necessary to protect their rights, resources, lands and territories.* |

| 3.2.2 | *Indicator* | *The legal and customary rights of Indigenous Peoples are not violated by The Organization.* |
|---|---|---|
| 3.2.3 | *Indicator* | *Where evidence exists that legal and customary rights of Indigenous Peoples related to management activities have been violated the situation is corrected, if necessary, through culturally appropriate engagement and/or through the dispute resolution process as required in Criteria 1.6 or 4.6.* |
| 3.2.4 | *Indicator* | *Free, prior and informed consent is granted by Indigenous Peoples prior to management activities that affect their identified rights through a process that includes:*<br>*1) Ensuring Indigenous Peoples know their rights and obligations regarding the resource;*<br>*2) Informing the Indigenous Peoples of the value, in economic, social and environmental terms, of the resource over which they are considering delegation of control;*<br>*3) Informing the Indigenous Peoples of their right to withhold or modify consent to the proposed management activities to the extent necessary to protect their rights, resources, lands and territories; and*<br>*4) Informing the Indigenous Peoples of the current and future planned forest management activities.* |
| *3.3* | Criterion | In the event of delegation of control over management activities, a binding agreement between The Organization and the Indigenous Peoples shall be concluded through Free, Prior and Informed Consent. The agreement shall define its duration, provisions for renegotiation, renewal, termination, economic conditions and other terms and conditions. The agreement shall make provision for monitoring by Indigenous Peoples of The Organization's compliance with its terms and conditions. |
| 3.3.1 | *Indicator* | *Where control over management activities has been granted through Free Prior and Informed Consent based on culturally appropriate engagement, the binding agreement contains the duration, provisions for renegotiation, renewal, termination, economic conditions and other terms and conditions.* |
| 3.3.2 | *Indicator* | *Records of binding agreements are maintained.* |
| 3.3.3 | *Indicator* | *The binding agreement contains the provision for monitoring by Indigenous Peoples of The Organization's compliance with its terms and conditions.* |
| *3.4* | Criterion | The Organization shall recognize and uphold the rights, customs and culture of Indigenous Peoples as defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989). |
| 3.4.1 | *Indicator* | *The rights, customs and culture of Indigenous Peoples as defined in UNDRIP and ILO Convention 169 are not violated by The Organization.* |
| 3.4.2 | *Indicator* | *Where evidence that rights, customs and culture of Indigenous Peoples, as defined in UNDRIP and ILO Convention 169, have been violated by The Organization, the situation is documented including steps to restore these rights, customs and culture of Indigenous Peoples, to the satisfaction of the rights holders.* |
| *3.5* | Criterion | The Organization, through engagement with Indigenous Peoples, shall identify sites which are of special cultural, ecological, economic, religious or spiritual significance and for which these Indigenous Peoples hold legal or customary rights. These sites shall be recognized by The Organization and their management, and/or protection shall be agreed through engagement with these Indigenous Peoples. |

| 3.5.1 | *Indicator* | *Sites of special cultural, ecological, economic, religious or spiritual significance for which Indigenous Peoples hold legal or customary rights are identified through culturally appropriate engagement.* |
|---|---|---|
| 3.5.2 | *Indicator* | *Measures to protect such sites are agreed, documented and implemented through culturally appropriate engagement with Indigenous Peoples. When Indigenous Peoples determine that physical identification of sites in documentation or on maps would threaten the value or protection of the sites, then other means will be used.* |
| 3.5.3 | *Indicator* | *Wherever sites of special cultural, ecological, economic, religious or spiritual significance are newly observed or discovered, management activities cease immediately in the vicinity until protective measures have been agreed to with the Indigenous Peoples, and as directed by local and national laws.* |
| *3.6* | Criterion | The Organization shall uphold the right of Indigenous Peoples to protect and utilize their traditional knowledge and shall compensate Indigenous Peoples for the utilization of such knowledge and their intellectual property. A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the Indigenous Peoples for such utilization through Free, Prior and Informed Consent before utilization takes place and shall be consistent with the protection of intellectual property rights. |
| 3.6.1 | *Indicator* | *Traditional knowledge and intellectual property are protected and are only used when the acknowledged owners of that traditional knowledge and intellectual property have provided their Free, Prior and Informed Consent formalized through a binding agreement.* |
| 3.6.2 | *Indicator* | *Indigenous Peoples are compensated according to the binding agreement reached through Free, Prior and Informed Consent.* |
| *4* | **Principle** | **Community Relations - The Organization shall contribute to maintaining or enhancing the social and economic wellbeing of local communities.** |
| *4.1* | Criterion | The Organization shall identify the local communities that exist within the Management Unit and those that are affected by management activities. The Organization shall then, through engagement with these local communities, identify their rights of tenure, their rights of access to and use of forest resources and ecosystem services, their customary rights and legal rights and obligations, that apply within the Management Unit. |
| 4.1.1 | *Indicator* | *Local communities that exist in the Management Unit and those that may be affected by management activities are identified.* |
| 4.1.2 | *Indicator* | *Through culturally appropriate engagement with the local communities identified in 4.1.1, the following are documented and/or mapped:*<br>*1) Their legal and customary rights of tenure;*<br>*2) Their legal and customary access to, and use rights, of the forest resources and ecosystem services;*<br>*3) Their legal and customary rights and obligations that apply;*<br>*4) The evidence supporting these rights and obligations;*<br>*5) Areas where rights are contested between local communities, governments and/or others;*<br>*6) Summary of the means by which the legal and customary rights, and contested rights are addressed by The Organization; and*<br>*7) The aspirations and goals of local communities related to management activities.* |
| *4.2* | Criterion | The Organization shall recognize and uphold the legal and customary rights of local communities to maintain control over management activities within or related to the Management Unit to the extent necessary to protect their |

| | | rights, resources, lands and territories. Delegation by local communities of control over management activities to third parties requires Free, Prior and Informed Consent. |
|---|---|---|
| 4.2.1 | *Indicator* | *Through culturally appropriate engagement local communities are informed of when, where and how they can comment on and request modification to management activities to the extent necessary to protect their rights.* |
| 4.2.2 | *Indicator* | *The legal and customary rights of local communities to maintain control over management activities are not violated by The Organization.* |
| 4.2.3 | *Indicator* | *Where evidence exists that legal and customary rights of local communities related to management activities have been violated the situation is corrected, if necessary, through culturally appropriate engagement and/or through the dispute resolution process in Criteria 1.6 or 4.6.* |
| 4.2.4 | *Indicator* | *Free, Prior and Informed Consent is granted by local communities prior to management activities that affect their identified rights through a process that includes:*<br>*1) Ensuring local communities know their rights and obligations regarding the resource;*<br>*2) Informing the local communities of the value, in economic, social and environmental terms, of the resource over which they are considering delegation of control;*<br>*3) Informing the local communities of their right to withhold or modify consent to the proposed management activities to the extent necessary to protect their rights and resources; and*<br>*4) Informing the local communities of the current and future planned forest management activities.* |
| *4.3* | Criterion | The Organization shall provide reasonable opportunities for employment, training and other services to local communities, contractors and suppliers proportionate to scale and intensity of its management activities. |
| 4.3.1 | *Indicator* | *Reasonable opportunities are communicated and provided to local communities, local contractors and local suppliers for:*<br>*1) Employment,*<br>*2) Training, and*<br>*3) Other services.* |
| *4.4* | Criterion | The Organization shall implement additional activities, through engagement with local communities, that contribute to their social and economic development, proportionate to the scale, intensity and socio-economic impact of its management activities. |
| 4.4.1 | *Indicator* | *Opportunities for local social and economic development are identified through culturally appropriate engagement with local communities and other relevant organizations.* |
| 4.4.2 | *Indicator* | *Projects and additional activities are implemented and/or supported that contribute to local social and economic benefit and are proportionate to the socio-economic impact of management activities.* |
| *4.5* | Criterion | The Organization, through engagement with local communities, shall take action to identify, avoid and mitigate significant negative social, environmental and economic impacts of its management activities on affected communities. The action taken shall be proportionate to the scale, intensity and risk of those activities and negative impacts. |
| 4.5.1 | *Indicator* | *Through culturally appropriate engagement with local communities, measures are implemented to identify, avoid and mitigate significant negative social, environmental and economic impacts of management activities.* |

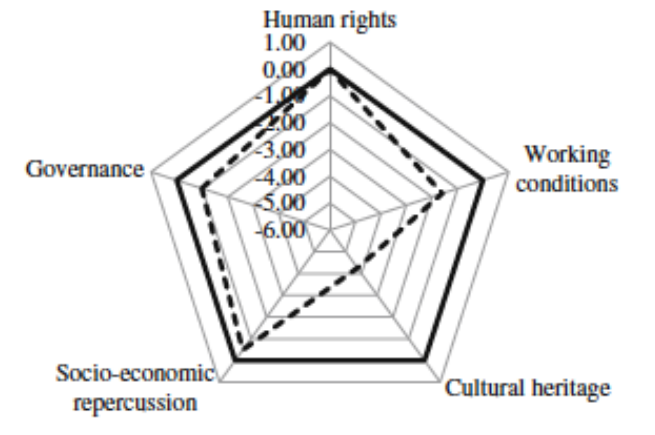| 4.6 | Criterion | The Organization, through engagement with local communities, shall have mechanisms for resolving grievances and providing fair compensation to local communities and individuals with regard to the impacts of management activities of The Organization. |
|---|---|---|
| 4.6.1 | *Indicator* | *A publicly available dispute resolution process is in place, developed through culturally appropriate engagement with local communities.* |
| 4.6.2 | *Indicator* | *Grievances related to the impacts of management activities are responded to in a timely manner, and are either resolved or are in the dispute resolution process.* |
| 4.6.3 | *Indicator* | *An up to date record of grievances related to the impacts of management activities is held including:*<br>*1) Steps taken to resolve grievances;*<br>*2) Outcomes of all dispute resolution processes including fair compensation to local communities and individuals; and*<br>*3) Unresolved disputes, the reasons they are not resolved, and how they will be resolved.* |
| 4.6.4 | *Indicator* | *Operations cease in areas while disputes exist of:*<br>*1) Substantial magnitude;*<br>*2) Substantial duration; or*<br>*3) Involving a significant number of interests.* |
| 4.7 | Criterion | The Organization, through engagement with local communities, shall identify sites which are of special cultural, ecological, economic, religious or spiritual significance, and for which these local communities hold legal or customary rights. These sites shall be recognized by The Organization, and their management and/or protection shall be agreed through engagement with these local communities. |
| 4.7.1 | *Indicator* | *Sites of special cultural, ecological, economic, religious or spiritual significance for which local communities hold legal or customary rights are identified through culturally appropriate engagement and are recognized by The Organization.* |
| 4.7.2 | *Indicator* | *Measures to protect such sites are agreed, documented and implemented through culturally appropriate engagement with local communities. When local communities determine that physical identification of sites in documentation or on maps would threaten the value or protection of the sites, then other means will be used.* |
| 4.7.3 | *Indicator* | *Whenever sites of special cultural, ecological, economic, religious or spiritual significance are newly observed or discovered, management activities cease immediately in the vicinity until protective measures have been agreed to with the local communities, and as directed by local and national laws.* |
| 4.8 | Criterion | The Organization shall uphold the right of local communities to protect and utilize their traditional knowledge and shall compensate local communities for the utilization of such knowledge and their intellectual property. A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the local communities for such utilization through Free, Prior and Informed Consent before utilization takes place, and shall be consistent with the protection of intellectual property rights. |
| 4.8.1 | *Indicator* | *Traditional knowledge and intellectual property are protected and are only used when the owners of that traditional knowledge and intellectual property have provided their Free, Prior and Informed Consent formalized through a binding agreement.* |

| 4.8.2 | *Indicator* | *Local communities are compensated according to the binding agreement reached through Free, Prior and Informed Consent for the use of traditional knowledge and intellectual property.* |
|---|---|---|
| *5* | **Principle** | **Benefits from the Forest - The Organization shall efficiently manage the range of multiple products and services of the Management Unit to maintain or enhance long term economic viability and the range of environmental and social benefits.** |
| *5.1* | Criterion | The Organization shall identify, produce, or enable the production of, diversified benefits and/or products, based on the range of resources and ecosystem services existing in the Management Unit in order to strengthen and diversify the local economy proportionate to the scale and intensity of management activities. |
| 5.1.1 | Indicator | *The range of resources and ecosystem services that could strengthen and diversify the local economy are identified.* |
| 5.1.2 | *Indicator* | *Consistent with management objectives, the identified benefits and products are produced by The Organization and/or made available for others to produce, to strengthen and diversify the local economy.* |
| 5.1.3 | Indicator | *When The Organization makes FSC promotional claims regarding the maintenance and/or enhancement of ecosystem services, Annex C is followed regarding additional requirements.* |
| *5.4* | Criterion | The Organization shall use local processing, local services, and local value adding to meet the requirements of The Organization where these are available, proportionate to scale, intensity and risk. If these are not locally available, The Organization shall make reasonable attempts to help establish these services. |
| 5.4.1 | Indicator | *Where cost, quality and capacity of non-local and local options are at least equivalent, local goods, services, processing and value-added facilities are used.* |
| 5.4.2 | *Indicator* | *Reasonable attempts are made to establish and encourage capacity where local goods, services, processing and value-added facilities are not available.* |
| *6.6* | Criterion | The Organization shall effectively maintain the continued existence of naturally occurring native species and genotypes, and prevent losses of biological diversity, especially through habitat management in the Management Unit. The Organization shall demonstrate that effective measures are in place to manage and control hunting, fishing, trapping and collecting. |
| 6.6.1 | *Indicator* | *Management activities maintain the plant communities and habitat features found within native ecosystems in which the Management Unit is located.* |
| 6.6.2 | Indicator | *Where past management has eliminated plant communities or habitat features, management activities aimed at re-establishing such habitats are implemented.* |
| 6.6.3 | *Indicator* | *Management maintains, enhances, or restores habitat features associated with native ecosystems, to support the diversity of naturally occurring species and their genetic diversity.* |
| 6.6.4 | Indicator | *Effective measures are taken to manage and control hunting, fishing, trapping and collecting activities to ensure that naturally occurring native species, their diversity within species and their natural distribution are maintained.* |
| *7.1* | Criterion | The Organization shall, proportionate to scale, intensity and risk of its management activities, set policies (visions and values) and objectives for management, which are environmentally sound, socially beneficial and |

| | | economically viable. Summaries of these policies and objectives shall be incorporated into the management plan, and publicized. |
|---|---|---|
| 7.1.1 | *Indicator* | *Policies (vision and values) that contribute to meeting the requirements of this standard are defined.* |
| 7.1.2 | *Indicator* | *Specific, operational management objectives that address the requirements of this standard are defined.* |
| 7.1.3 | *Indicator* | *Summaries of the defined policies and management objectives are included in the management plan and publicized.* |
| *7.2* | Criterion | The Organization shall have and implement a management plan for the Management Unit which is fully consistent with the policies and objectives as established according to Criterion 7.1. The management plan shall describe the natural resources that exist in the Management Unit and explain how the plan will meet the FSC certification requirements. The management plan shall cover forest management planning and social management planning proportionate to scale, intensity and risk of the planned activities. |
| 7.2.1 | *Indicator* | *The management plan includes management actions, procedures, strategies and measures to achieve the management objectives.* |
| 7.2.2 | *Indicator* | *The management plan addresses the elements listed in Annex E, and is implemented.* |
| *7.4* | Criterion | The Organization shall update and revise periodically the management planning and procedural documentation to incorporate the results of monitoring and evaluation, stakeholder engagement or new scientific and technical information, as well as to respond to changing environmental, social and economic circumstances. |
| 7.4.1 | *Indicator* | *The management plan is revised and updated periodically consistent with Annex F to incorporate:* <br> *1) Monitoring results, including results of certification audits;* <br> *2) Evaluation results;* <br> *3) Stakeholder engagement results;* <br> *4) New scientific and technical information, and* <br> *5) Changing environmental, social, or economic circumstances.* |
| *8.2* | Criterion | The Organization shall monitor and evaluate the environmental and social impacts of the activities carried out in the Management Unit, and changes in its environmental condition. |
| 8.2.1 | *Indicator* | *The social and environmental impacts of management activities are monitored consistent with Annex G.* |
| 8.2.2 | *Indicator* | *Changes in environmental conditions are monitored consistent with Annex G.* |
| *9.1* | Criterion | The Organization, through engagement with affected stakeholders, interested stakeholders and other means and sources, shall assess and record the presence and status of the following High Conservation Values in the Management Unit, proportionate to the scale, intensity and risk of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: <br><br> **HCV 1** - Species diversity. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels. <br><br> **HCV 2** - Landscape-level ecosystems and mosaics. Intact forest landscapes and large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of |

| | | the great majority of the naturally occurring species in natural patterns of distribution and abundance.

**HCV 3** - Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats or refugia.

**HCV 4** - Critical ecosystem services. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

**HCV 5** - Community needs. Sites and resources fundamental for satisfying the basic necessities of local communities or Indigenous Peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or Indigenous Peoples.

**HCV 6** - Cultural values. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples |
|---|---|---|
| 9.1.1 | *Indicator* | *An assessment is completed using Best Available Information that records the location and status of High Conservation Value Categories 1-6, as defined in Criterion 9.1; the High Conservation Value Areas they rely upon, and their condition.* |
| 9.1.2 | *Indicator* | *The assessment uses results from culturally appropriate engagement with affected and interested stakeholders with an interest in the conservation of the High Conservation Values.* |

## Appendix C - Table overview methods

| Method | Literature | Description/definition | General remarks and explaining method | What aspect could potentially be used? | In what way is this method not relevant? |
|---|---|---|---|---|---|
| **CAR-analysis** | Peña-Claros, Blommerde & Bongers (2009) | CAR analysis "is an indirect way of measuring the impact of certification at the FMU level" {…}<br><br>"CAR analysis is an appropriate tool for evaluating the impact of forest management certification because the majority of the issues raised in the list of CAR could be followed by reviewing the annual audits." {…} | Analyses CARs from different audit reports and categorizes them in the three different pillars of FSC, in order to analyse and follow up on the most important impact categories. This evaluation leads to conclusions on how well the FSC guidelines are implemented. This way of analysing leads to an indirect way of measuring the impact of certification.<br><br>Relevant for this research: data availability is similar to this research and approach can be used to conclude on social impacts. No comparison possible due to the fact that only the own reports are evaluated: no baseline or reference. | The data that are used are also available for this research. This method is context specific and close to the intended source for this research (FSC). This method used the available data (and the lack of data from the field) as starting point of how to conduct the research.<br><br>Applicable to this situation as well as a proven method. | One has to be critical on what social impact can be assessed using this method.<br><br>Not focussed on monetising. |
| **Socio-economic Costs: s-eco-costs**<br><br>**(S-LCA method)** | Velden & Vogtländer (2017) | "The s-eco-costs are the marginal prevention costs to reach a sustainable level for wages and are the monetary compensation costs beyond this sustainable level to account for unacceptable exploitation of workers. It includes five sub-indicators: Minimum Acceptable Wage, Child Labour, Extreme Poverty, Excessive Working Hours, Occupational Safety and Health." {…} | S-eco-cost is a method for S-LCA. As opposed to regular S-LCA, the s-eco-cost method compares similar products in different socio-economic contexts. Therefore, a decision or conclusion can be made which of those products is the preferred one. Part of the calculation also involves DALY, which in this case is a practical lever to translate 'social aspects' into monetary terms.<br><br>It is a form of internalising externalities. | It is prevention-based method, which leaves out the weighting: a subjective part of the analysis.<br><br>It calculates the gap between living wage and minimum wage and puts a price on that. Furthermore, this method uses general data to compare between countries, which is easily available, but less relevant for context specific aspects such as social ones. In addition, they use DALY as way of converting to monetary terms.<br><br>The s-eco-cost method purposefully chooses a monetary unit to express the results, because it is easily understood. This is also one of the few S-LCA methods that enable social aspects to be expressed into monetary terms. | This method needs general data that are not context specific. Where data are context specific, similar types of data are not available for (tropical certified) timber. Furthermore, this method is based on the principle of comparison: comparable data on non-certified timber are not available either.<br><br>The focus of this study is solely on workers rather than encompassing community as well.<br><br>Just like LCA the goal and scope need to be defined. This is outside the scope of this research. Furthermore, this research is not based on the whole life cycle. |
| **Eco Social Cost Unit: ESCU**<br><br>**(S-LCA method)** | Croes & Vermeulen (2015) | ESCU "uses the principles of standard financial accounting for seeking to determine the hidden preventative costs of products at all links of the supply chain and for transferring these through the supply chain in a similar manner to standard costs. The ESCUs will be determined by the supply chain actors themselves according to a normalized, third-party-verified method." {…}<br><br>Croes and Vermeulen "propose a system for the measurement of product sustainability by copying the normal mechanism for transfer of prices through the supply chain for the currently hidden, preventative costs-based "Eco Social Cost Units" (ESCUs). The ESCU is the sum of the preventative costs for all issues." {…} | Continuation of S-Eco-Cost. Also a form of internalising externalities. | Once the full database is in place, it is a fairly easy method to calculate the marginal costs.<br><br>It is expressed in monetary terms.<br><br>It uses certification as best practice example. It also serves as an inspiration for this method: "One of the strengths of certification is the reversal of proof, to which organizations submit themselves. Without evidence of compliance, no certificate is issued and non-compliance may be assumed. The idea of the "Oiconomy project" is to utilize this type of system for the standardized and verifiable measurement and transparent transfer of preventative costs-based externalities". | The method is not explained in its research. Therefore, it is not iterative. It seems more theoretical, rather than practical.<br><br>There is a focus on marginal (and/or preventative) cost, which is the minimum requirements for fair life cycle aspects. Certification has a focus on surpassing this minimum.<br><br>This method needs standards and available data from supply chain that are not yet available. |
| **Social Life Cycle Assessment: S-LCA** | In general:<br><br>UNEP Setac Life Cycle Initiative (2009)<br><br>Benoît et al. (2010)<br><br>Wu, Yang & Chen (2014)<br><br>van Haaster, Ciroth, Fontes, Wood & Ramirez (2017)<br><br>Lenzo, Traverso, Salomone & Ioppolo (2017)<br><br>Petti, Serreli & Di Cesare (2018) | "S-LCA is a social impact (and potential impact) assessment technique that aims to assess the social and socio-economic aspects of products and their potential positive and negative impacts along their life cycle encompassing extraction and processing of raw materials; manufacturing; distribution; use; re-use; maintenance; recycling; and final disposal." {(UNEP/SETAC 2009)} | For S-LCA there are different methods and examples available in the scientific database. Due to lack of clarity in guidelines, they all differ in their approach.<br><br>The research concludes that S-LCA is still in its infancy state. Therefore, there is still not one clear method to be used. This also makes it unclear when a research on social impact could be labelled as S-LCA.<br><br>Some of the prerequisites for a S-LCA are:<br><br>• Definition of goal and scope<br>• Functional unit definition (debatable for some authors) | This method is made solely for the purpose of identifying social impact. Therefore, it is a relevant method for this research objective.<br><br>Working hours is an important variable in a S-LCA, though it is indicative (it does not equal social impact).<br><br>Depending on which method you choose, you can also do it as a desktop research and get data from company reports, but it is more complex (Wu et al., 2014). | S-LCA is on the whole life cycle, assessing the whole life cycle is irrelevant for this research. For S-LCA a goal and scope is necessary. E.g. system boundaries need to be defined, however the use phase is not relevant for this research.<br><br>S-LCA needs an elaborate research in order to get much data input, which in turn is only focussed on one product from one source (or one project).<br><br>One of the biggest problems with S-LCA is the unavailability of social impact and modelling data (Benoît et al., 2010). "The key problem (…) is that data should be available for at least the most relevant specific |

| | | | | | |
|---|---|---|---|---|---|
| | | | • Life cycle approach, mostly from cradle to grave | | manufacturing locations in the production chain, and that these specific data are hard to get" (Velden & Vogtländer, 2017). There is no common unit for assessment, as opposed to monetary units with different methods. Also, data are often not comparable. The method is still in development. The guidelines by UNEP and SETAC leave room for interpretation. |
| | As an example: Manik, Leahy & Halog (2013) | Analysis (using S-LCA and stakeholder interviews) of a (social) intervention of a project or organisation. In the analysis, the intended impact is assessed and subsequently how it is perceived by the local stakeholders. This gap is multiplied by a weighting factor that is generated from expert interviews: e.g. less relevant categories have a smaller gap. | This is an example of a S-LCA method. This research has a focus on the weighting of different social aspects for their relevant theme (palm oil biodiesel) as well as calculating the gap between what the stakeholders expected from the intervention and what the perceived impact is (subjective method). | The main result of the study is the weighting and the perception of the social impact. Their visualisation of these results could be a relevant approach:  | The data are gathered on the ground with many (local) stakeholders. The study does not come to a conclusion on what the actual impact is, but only what the gap (multiplied by the weight given) is. |
| (Societal) Life-cycle costing: (S)LCC | No author available, information from lecture by Dr. Blanca Corona (01/12/2017) (Master 'Sustainable Development', Course 'Toolbox 1') | LCC is a compilation and assessment of all costs related to a product, over its entire life cycle. LCC is an "economic assessment considering all agreed projected significant and relevant cost flows over a period of analysis expressed in monetary value. The projected costs are those needed to achieve defined levels of performance, including reliability, safety and availability." (Buildings and Constructed Assets, Service-life Planning, Part 5: Life-cycle Costing (ISO 15686-5)) | | Expressed in monetary terms. Monetisation is a form of LCC. Systematically it looks like (S)LCA, but the difference is the conversion to money. SLCC could potentially include societal benefits and disadvantages. | SLCC focuses on the whole life cycle of on one product: irrelevant for use in this research. It is a tool designed for appliances or projects. There is a great emphasis on financial returns: wider socio- economic gains need to be factored in. There are usually no social aspects taken into account. Practical examples of SLCC are still non-existent. |

Note: Life Cycle Sustainability Assessment: LCSA = LCA + LCC + S-LCA (Kloepffer, 2008)

# Appendix D - Tables for results sub-question 4

| | 'FSC Principle' | FSC Criterion | FSC Indicator | Total indicators for data collection | % |
|---|---|---|---|---|---|
| *Principle 1* | | 1 | 4 | 5 | 4,2% |
| *Principle 2* | 1 | 6 | 28 | 35 | 29,4% |
| *Principle 3* | 1 | 6 | 16 | 3 | 19,3% |
| *Principle 4* | 1 | 8 | 19 | 28 | 23,5% |
| *Principle 5* | 1 | 2 | 5 | 8 | 6,7% |
| *Principle 6* | | 1 | 4 | 5 | 4,2% |
| *Principle 7* | | 3 | 6 | 9 | 7,6% |
| *Principle 8* | | 1 | 2 | 3 | 2,5% |
| *Principle 9* | | 1 | 2 | 3 | 2,5% |
| *Principle 10* | | | | 0 | 0% |
| *Total* | *4* | *29* | *86* | *119* | *100%* |

Table 8 Number of socially relevant indicators found in 'FSC Principles and Criteria' used for data collection

| | Major | Minor | Observation | Total | % |
|---|---|---|---|---|---|
| *Principle 1* | | | | | 0% |
| *Principle 2* | 2 | 79 | 17 | 98 | 63% |
| *Principle 3* | | 6 | 3 | 9 | 6% |
| *Principle 4* | | 9 | 10 | 19 | 12% |
| *Principle 5* | | | 1 | 1 | 1% |
| *Principle 6* | | | | | 0% |
| *Principle 7* | | 8 | | 8 | 5 |
| *Principle 8* | | 14 | 7 | 21 | 13% |
| *Principle 9* | | | | | 0% |
| *Total* | *2* | *116* | *38* | *156* | *100%* |

Table 9 Total number of CARs per principle

| | Number of certified FMUs in sample | Major with weight (number of CARs) | Minor with weight (number of CARs) | Observation with weight | Total with weight (number of CARs) | Average weight / (number of CARs) per certification | Grade per country |
|---|---|---|---|---|---|---|---|
| Bolivia | 1 | | 3 (1) | | 3 (1) | 3 (1) | 6,5 |
| Brazil | 27 | | 96 (32) | 14 | 110 (46) | 4,07 (1,70) | 6,3 |
| Cambodia | 1 | | | | | | 10,0 |
| Cameroon | 1 | | | | | | 10,0 |
| Colombia | 2 | | 12 (4) | 1 | 13 (5) | 6,5 (2,5) | 6,0 |
| Costa Rica | 3 | | 6 (2) | 2 | 8 (4) | 2,66 (1,33) | 6,7 |
| Ecuador | 1 | | | 1 | 1 (1) | 1 (1) | 8,6 |
| Fiji | 1 | | 6 (2) | | 6 (2) | 6 (2) | 6,0 |
| Gabon | 2 | | 24 (8) | 2 | 26 (10) | 13 (5) | 5,7 |
| Ghana | 1 | | 3 (1) | 1 | 4 (2) | 4 (2) | 6,3 |
| Guatemala | 2 | | | | | | 10,0 |
| Guyana | 1 | | 3 (1) | | 3 (1) | 3 (1) | 6,5 |
| India | 2 | | 3 (1) | | 3 (1) | 1,5 (0,5) | 7,6 |
| Indonesia | 8 | | 45 (15) | 6 | 51 (21) | 6,38 (2,63) | 6,0 |
| Malaysia | 3 | | 9 (3) | | 9 (3) | 3 (1) | 6,5 |
| Mexico | 20 | | 81 (27) | 4 | 85 (31) | 4,25 (1,55) | 6,2 |
| Panama | 2 | | 9 (3) | | 9 (3) | 4,5 (1,5) | 6,2 |
| Peru | 2 | | 3 (1) | 1 | 4 (2) | 2 (1) | 7,0 |
| PNG | 1 | | 6 (2) | | 6 (2) | 6 (2) | 6,0 |
| R. Congo | 1 | | 6 (2) | 2 | 8 (4) | 8 (4) | 5,9 |
| Tanzania | 1 | | | | | | 10,0 |
| Thailand | 4 | | 3 (1) | | 3 (1) | 0,75 (0,25) | 9,6 |
| Uganda | 1 | | 3 (1) | | 3 (1) | 3 (1) | 6,5 |
| Uruguay | 5 | | 3 (1) | 2 | 5 (3) | 1 (0,6) | 8,6 |
| Vietnam | 9 | 16 (2) | 24 (8) | 2 | 42 (12) | 4,67 (1,33) | 6,2 |
| **Total** | **102** | **16 (2)** | **348 (116)** | **38** | **402 (156)** | | |
| **Average** | **4,08** | | | | | **3,94 (1,53)** | **7,2** |

Table 10 Number of certified FMUs in sample per country, number of CARs (with weight) per country and grade per country

| | Number of employees | Number of accidents | Percentage accidents / employee | Number of fatal accidents | Percentage fatal accidents per employee |
|---|---|---|---|---|---|
| Bolivia | 56 | | | | |
| Brazil | 16.732 | 68 | 0,4% | | |
| Cambodia | 263 | | | | |
| Cameroon | 333 | 22 | 6,6% | | |
| Colombia | 503 | 23 | 4,6% | | |
| Costa Rica | 156 | 2 | 1,3% | | |
| Ecuador | 239 | | | | |
| Fiji | 401 | | | | |
| Gabon | 882 | 28 | 3,2% | | |
| Ghana | 317 | | | | |
| Guatemala | 454 | | | | |
| Guyana | 19 | | | | |
| India | 1.237 | | | | |
| Indonesia | 2.970 | 11 | 0,4% | 2 | 0,067% |
| Malaysia | 1.678 | 1 | 0,1% | | |
| Mexico | 1.342 | 3 | 0,2% | 1 | 0,075% |
| Panama | 105 | | | | |
| Peru | 54 | 1 | 1,9% | | |
| PNG | 276 | 1 | 0,4% | | |
| R. Congo | 910 | 5 | 0,5% | 1 | 0,110% |
| Tanzania | 167 | | | | |
| Thailand | 1.478 | | | | |
| Uganda | 10 | | | | |
| Uruguay | 707 | | | | |
| Vietnam | 1.381 | | | | |
| **Total** | **32.670** | **165** | | **4** | |
| Average | 1306,8 | 7 per country | 0,51% per employee | 0,16 per country | |

Table 11 Number of employees in sample per country and number and percentage of (fatal) accidents