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The voluntary carbon market as an
opportunity for the Sustainable
Forest Management sector

A state of affairs



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Executive Summary

In the fight against climate change, forests have come to the forefront as valuable carbon storage assets, imperative in climate change mitigation and adaptation. This opens avenues within carbon finance for SFM operators in tropical forests and can create much needed additional carbon revenue streams. These can aid sustainable forestry with revenues for activities contributing to carbon sequestration, and the broader ecological and social impact of tropical forest management. This paper, based on literature review and company expertise, explores the opportunities and place of SFM in the carbon market. We analyse applicable methodologies, reflect on the role of SFM in the market, the technicalities of SFM's carbon claims and improvements to positioning of SFM to start benefitting from climate finance.

SFM carbon accounting methods

There are ten available methodologies for carbon accounting for use within SFM, all part of Verra's VCS certification system. They concern carbon stock enhancement, extended rotation length, REDD+, RIL-C and set-asides. The methodologies rely on comparable tools and there is consensus between the methodologies regarding additionality and baseline assessment, and biomass approximations from field data. Methodologies differ in their data sources and analytical methods. The most pronounced gap in the methodologies is the inability to implement multiple forms of SFM within one methodology. This caveat, however, will be resolved with the foreseen approval of the *Methodology for Improved Forest Management*, currently under assessment.

Concerns exist regarding additionality, permanence and leakage in SFM carbon accounting. Additionality of SFM projects in the tropics can usually be demonstrated through baseline scenarios of deforestation/degradation and financial/technical barriers in absence of carbon finance. Validated projects and methodologies provide growing support for IFM's additionality claims. Permanence of SFM is strong as it generally concerns long-term concession titles and management plans. Carbon finance can strengthen economic viability of SFM operations, leading to more permanence. Leakage can occur for REDD+ and set-aside projects when reduced timber harvesting levels lead to increased logging activities in other locations, but VCS allows discounting such risks.

The impact of SFM and its relation to other projects

SFM brings climate, community and biodiversity benefits, which can be solidified by CCB certification. IFM carbon credit requirements overlap with SFM certification schemes, e.g. FSC and PEFC, thereby lowering the threshold for carbon certification in FSC/PEFC certified areas. SFM carbon projects are part of Nature Climate Solutions (NCS), carbon-positive conservation, restoration, and/or improved land management actions. When comparing SFM to other NCS projects, strong points are forest protection, organisational and financial stability, biodiversity relevance, contribution towards circular bioeconomy, employment generation, project size and carbon credit volumes. Weak spots for SFM are community relevance and offsetting for net zero claims, which the current science-based target initiative guidelines do not allow.

Current market status for SFM carbon projects

The global area of sustainably managed represents 15 times the area engaged in carbon offsetting projects. REDD+ credits are most abundant in the AFOLU market, followed by ARR. IFM projects only represent 9% of projects and 3.5% of total carbon credits. Annual emission reduction of registered VCS AFOLU projects is 90 million tCO₂eq, with 77% coming from REDD+ projects and 7% from IFM. REDD+ projects will therefore continue to dominate the market. South America is the region with most REDD+ and ARR AFOLU projects. Asia is the region with most IFM projects.



Successes & constraints

The number of SFM carbon projects is still very small, but registered projects have become successful. REDD+ projects have been able to sell high volumes of credits. Knowing your way in the carbon market, having sufficient volumes to sell, and being flexible on prices has been important for success. Key barriers and constraints to consider when developing SFM carbon projects include negative public perceptions; technical carbon accounting arguments; the cost-benefit of project development; upcoming national and jurisdictional REDD+ programmes; and research and methodological gaps.

Stakeholder analysis

Large NGOs like The Nature Conservancy and WWF support IFM, but their communication concerns conservation/restoration without timber production. Positive press on IFM must compete with negative perceptions that are voiced more strongly. Positions of carbon credit buyers regarding SFM and IFM vary. Generally, they prefer projects that enable storytelling, which is less evident for IFM than reforestation or conservation. Some will avoid projects with logging, others will purchase but avoid it in communication. Some buyers hesitate to “sponsor” for-profit companies because of questionable financial additionality. However, the true bottleneck seems to be lack of supply and not unwillingness to buy. The financial sector has restrictions on financing logging in tropical forests, which restricts participation of DFIs in SFM and IFM. On the government level, IFM has been adopted into the national Forest Reference Emission Levels of Surinam and Gabon, which forms the building blocks for national REDD+ systems. This can be leveraged upon by the SFM sector.

Trends and opportunities for SFM carbon project

Increasing market demand and prices

Demand of voluntary credits is expected to boom, particularly from NCSs, and is driven by corporate buyers and CORSIA. The demand for voluntary carbon credits could increase by a factor of 15 or more by 2030 and prices may rise to USD20-50 per metric ton of CO₂.

SFM and the circular bioeconomy

Wood products from SFM fit within the “circular bioeconomy”, an upcoming economic model in which resources are renewable, sustainably managed, recovered and reused. Currently, SFM companies place little focus on the benefits of their wood products, which store carbon. The proposed EU-Carbon tax legislation could increase the use of carbon-benefits of timber through taxation of polluting materials in the upcoming decade. This would increase the economic competitiveness of wood as building material to be imported into the EU.

Opportunities and positioning of SFM on the carbon market

This input paper identified various opportunities for SFM operators on the carbon market. The booming carbon and NCS market, with increasing prices trends, will lead to higher demands for IFM carbon credits, supporting a financially attractive business case for SFM companies to engage in IFM carbon projects. Certifying SFM concessions under the VCS standard in combination with CCB holds most potential for SFM companies and can help upscale IFM practices, and help implement wider, impact-focused landscape programmes. Sufficient methods for carbon accounting of SFM have been identified. SFM companies, and the sector in general, could focus on working with these already existing methods, while keeping their constraints and national developments under REDD+ in mind.



In their positioning, the SFM sector could focus on promoting the multiple benefits of SFM as well as pointing out the size of forestry concessions and the scale of production forests in the tropics. SFM companies can emphasize that by leaving out SFM, carbon investors and buyers are ignoring significant tracts of forest in the tropics which face deforestation/degradation as real potential alternatives. Storytelling focused on SFM's forest conservation, biodiversity and social benefits could be a main strategy to change negative perceptions of investors and buyers on the market.

Success factors and next steps

Sector level

For success in the carbon market, the SFM sector's first task is to acquire broader and deeper knowledge on carbon certification options and analyse the feasibility of projects. International timber trade organisations such as ITTO, ATIBT, certification scheme owners, as well as multilateral organisations (FAO, World Bank) and supportive NGOs can be triggered to support this opportunity for the SFM sector, realize studies in cooperation with academia, promote new projects and publish news articles on the topic. The key is to get to science-backed, high-quality methodologies and projects where additionality and impact is demonstrated beyond doubt. This will also be important for lobbying activities at (inter)national regulating and standard-setting bodies.

In terms of positioning and USPs we have pointed out that carbon markets and NCS strategies cannot do without SFM. SFM's strengths must be communicated better, and weaknesses mitigated. On the technical front, methodology development will be important to realize cost-effective carbon accounting, and broad applicability. Exploration of new technologies, in particular remote sensing, is highly recommended. The upcoming *Methodology for Improved Forest Management*, currently under assessment by Verra, may offer opportunities, and advances in remote sensing already enable new methods that are currently not yet part of all approved methodologies.

As a sector, addressing the need for high-quality IFM projects that are clearly additional, have social and community relevance, and where carbon permanence is beyond doubt, is imperative. Having an additional and central portal or platform designed for registered, high-quality-checked SFM companies could be helpful. This can provide the additional transparency and openness for such projects that is currently lacking and provide a space for Q&A open to credit buyers, media and public. This could help to convey the story the SFM sector: sustainable logging can help protect large swaths of tropical forests from being converted or degraded.

Company level

For SFM companies, addressing the strengths of SFM practices, as well as mitigating weaknesses in comparison with other NCS projects, is key. At company level, community relevance may often be one of the major weaknesses compared to other AFOLU projects. Creating impact and stimulating sustainable land-use practices among social groups to avoid wider landscape degradation, as well as benefit-sharing systems, will be important for demonstrating community impact and contribute to positive and monetizable emission reductions. Carbon revenues could be partly used for such programmes. Companies should convey a convincing and truthful story, and address ability to deliver, track record and reputation towards carbon buyers.

Lastly, incubator funds or carbon-backed credit and technical assistance mechanisms that help SFM companies to pre-invest in the relatively high upfront costs of carbon certification, could strongly support SFM companies to obtain carbon certification and access the quickly growing carbon markets.



Contents

Executive Summary	3
Contents.....	6
Acronyms & Abbreviations	7
1. Introduction.....	8
2. SFM carbon accounting methods and positive impacts.....	9
2.1. SFM carbon accounting methods - state of affairs	9
2.2. Additionality, permanence and leakage in SFM projects.....	10
2.3. Overview of methodologies	11
2.4. The impact of SFM and its relation to other project types	12
3. Current market status for SFM carbon projects	17
3.1. Facts.....	17
3.2. Successes	20
3.3. Constraints	20
4. Stakeholder analysis.....	21
5. Trends and opportunities for SFM carbon projects	24
5.1. Carbon market trends	24
5.2. The role of SFM in a circular bioeconomy.....	26
5.3. Opportunities for SFM on the carbon market.....	27
6. Success factors, conclusions and next steps.....	30
6.1. SFM sector level	30
6.2. Company level	31
7. References	32
Appendix 1: Summary overview of carbon accounting methods.....	36
Carbon stock enhancement	36
REDD+ including logging.....	36
RIL-C.....	36
Set-asides	37
Increased rotation length.....	37
Fire management	38
Methodologies under development	38



Acronyms & Abbreviations

AFOLU	Agriculture, Forestry and Other Land Use
ARR	Afforestation, Reforestation and Revegetation
ART	Architecture for REDD+ Transactions
CCB	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CI	Conservation International
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DFI	Development Financial Institution
EM	Ecosystem Marketplace
ENGO	Environmental Non-Governmental Organisation
ETS	Emission Trading System/Scheme
FAO	Food and Agriculture Organisation
FSC	Forest Stewardship Council
GHG	Greenhouse Gas
GS	Gold Standard
IFM	Improved Forest Management
tCO ₂ eq	Tonne of carbon dioxide equivalent
NCS	Nature Climate Solutions
NDC	Nationally Determined Contribution
NTFP	Non-Timber Forest Product
REDD+	Reducing Emissions from Deforestation and forest Degradation
RIL-C	Reduced Impact Logging for Climate
SBTi	Science Based Targets Initiative
SFM	Sustainable Forest management
TNC	The Nature Conservancy
TREES	The REDD+ Environmental Excellence Standard
UNFCCC	United Nations Framework Convention on Climate Change
USPs	Unique Selling Points
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
WWF	World Wide Fund for Nature



1. Introduction

Climate change is seen by many as the great crisis of our time with its effects being felt more and more directly by people from across the globe. Just the past few months we have seen the daunting examples: forest fires in almost every forest biome on the planet, floods and hurricanes that cost human lives and wreak havoc as they pass. In the fight against climate change, forests have come to the forefront as valuable carbon storage assets, which are imperative in climate change mitigation and adaptation. As this role of forests is embraced more and more, new avenues open up for Sustainable Forest Management (SFM) operators in tropical forests. The SFM sector can reposition itself as an essential partner in the fight against global climate change. This can create much needed additional carbon revenue streams to finance sustainable forestry operations while delivering the vast range of ecosystem services that the sector is familiar with, but has always struggled to convey to other stakeholders.

This paper explores the state of affairs regarding SFM in relation to particularly voluntary carbon markets. We will explore what role SFM plays in this market, explore the technicalities of SFM's carbon claim, and we look into improved positioning of SFM to start benefitting from climate finance. To start with the bad news: SFM currently does not play a big role in this market and has struggled to secure its position. The good news is that the forest carbon market is booming. Carbon offsets from forests as part of Nature Climate Solutions (NCS) are the most demanded carbon offsets, and there is a large market to move into. Just this week, new market reports by Ecosystem Marketplace showed a record carbon credit sales between January-August 2021 of 240 million tCO₂: almost double the 2019 annual sales and on track to break USD 1 Billion before end of the year (EM 2021b).

The paper is structured as follows: Chapter 2 provides technical backgrounds on carbon claims from SFM operations according to carbon market methodologies, as well as positive impacts of SFM that can be used in voluntary carbon markets. Chapter 3 reviews the current market status of SFM carbon projects based on existing projects and provides reflection on successes and constraints. Chapter 4 contains stakeholder views regarding SFM and voluntary carbon markets. Chapter 5 highlights trends and opportunities for SFM in the market, including for positioning. Chapter 6 closes with criteria for success and next steps for advanced positioning of SFM in the carbon market. The key recommendations in chapter 5 and 6 are visually highlighted.

We have prepared this paper based on literature review and Form International's experience as forest carbon project developer, forestry investment manager and consultant. This document has been commissioned by Precious Forest Foundation as input for the SFM carbon roundtable organised by the Precious Forest Foundation. We hope this paper will be of use to the participants and we look forward to the exchanges and follow up actions.



2. SFM carbon accounting methods and positive impacts

2.1.SFM carbon accounting methods - state of affairs

There are ten carbon accounting methodologies for benefits from SFM in tropical forests, which is generally referred to as Improved Forest Management (IFM). All have been developed under the Verified Carbon Standard (VCS) by standard setting organisation Verra. These methodologies are partly based on tools created under the UNFCCC’s Clean Development Mechanism (CDM). IFM methodologies can be categorized as follows: carbon stock enhancement, extended rotation length, REDD+, RIL-C and set-asides. Relevant methodologies per category are presented in Table 1 and further analyses are presented in Appendix I.

Table 1: Overview of relevant methodologies for carbon accounting of SFM projects in tropical forests.

IFM categories	Relevant methodologies				
Carbon stock enhancement	VM0005 Methodology for Conversion of Low-productive Forest to High-productive Forest, v1.2				
REDD+ including logging	VM0006 Methodology for Carbon Accounting for Mosaic and Landscape-scale REDD+ Projects, v2.2	VM0007 REDD+ Methodology Framework (REDD+MF), v1.6	VM0009 Methodology for Avoided Ecosystem Conversion, v3.0	VM0037 Methodology for Implementation of REDD+ Activities in Landscapes Affected by Mosaic Deforestation and Degradation, v1.0	VM0015 Methodology for Avoided Unplanned Deforestation, v1.1
Set-asides	VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest, v1.3	VM0011 Methodology for Calculating GHG Benefits from Preventing Planned Degradation, v1.0			
RIL-C	VM0035 Methodology for Improved Forest Management through Reduced Impact Logging v1.0				
Extended rotation length	VM0003 Methodology for Improved Forest Management through Extension of Rotation Age, v1.2				

These methodologies allow for verification of carbon credits from avoided emissions (extended rotation length, RIL-C, set-asides, REDD+), and to some extent, carbon sequestration. Carbon stock enhancement can incorporate a combination of both. This differentiation is important in the market, as buyers can have preferences or restrictions for either credit type.



2.2. Additionality, permanence and leakage in SFM projects

Before analysing the five IFM types will address key overarching quality and integrity considerations that have drawn debate for forest carbon projects: additionality, permanence and leakage. We briefly assess IFM's performance regarding these aspects.¹

Additionality

The demonstration of additionality in carbon projects is essential to the integrity and market acceptance of carbon projects. Although additionality is project specific, we herewith list key arguments for IFM projects:

Alternative land-use scenarios: in the absence of IFM interventions, land use scenarios include (un)planned deforestation/degradation. The IFM project has carbon emission reductions or removals compared to the baseline scenario and keeps the forest standing.

Investment analysis: financial incentives for deforestation/degradation in tropical forest are often higher than those for SFM. The difference cannot always be bridged by timber prices and revenues. As such, this additionality type can be demonstrated for many SFM projects.

Barrier analysis: barrier analysis analyses if a project faces impassable barriers without carbon finance. By pointing to deforestation/degradation pressures, lack of finance and other complexities, SFM projects can often successfully argue that significant barriers exist.

Common practice analysis: projects need to demonstrate that they perform better than sector common practice, as carbon finance should not finance business as usual. This is often the case in SFM projects when the alternative land-use scenario is deforestation, unsustainable logging or provides much lower co-benefits for communities and biodiversity.

Additionally, projects need to be additional to governmental targets, particularly the Nationally Determined Contributions (NDCs) that constitute national climate pledges under the Paris Climate Agreement. Double counting and claiming needs to be avoided (see also section 5.1). Verra provides guidance to avoid double counting in relation to the NDCs as rules are being developed. Critiques regarding baseline setting and additionality have been raised. Cases of opportunistic application of the above analyses and selection of reference emission levels have happened and have led to cases of unrealistic carbon claims for REDD+ projects. However, Verra constantly improves its rules and requirements to achieve consistency, quality and incorporation of the best scientific insights. The available methodologies and validated IFM projects provide a growing body of arguments and data to substantiate IFM's additionality claims.

Permanence

There is broad consensus that carbon offsets need to be permanent. That means that avoided emissions or removals keep their effect for at least 20 years, sometimes up to 100 years. SFM generally takes place in contexts with long term concession titles (often renewable) and long-term management plans. IFM carbon finance can strengthen the economic viability to keep long term SFM operations afloat, which leads to more permanence. Alternative land use scenarios of

¹ For a more elaborate analysis see Griscom & Cortez 2013.



deforestation/degradation lead to less permanent forest cover. The SFM case for permanence is therefore strong in our view.

Leakage

Leakage is the risk that activities causing emissions shift to other locations. IFM categories RIL-C, carbon enhancement and extended rotation do not see leakage, as logging activities are not shifted, but carbon emissions are reduced by changing management practices. For REDD+ (including logging) and set-aside areas, leakage occurs when timber harvesting shifts to other locations locally or internationally. Carbon methodologies apply discounts for such leakage risks. Currently, Verra does not offer an option to account for international leakage, which is hard to approximate due to unclear causality and impaired traceability. Yet, given that timber production is prompted by regional and international demand, international leakage is a serious factor during carbon accounting for SFM.

2.3. Overview of methodologies

Since all methodologies for carbon accounting for SFM in tropical forests are under Verra, and many rely on the same tools, consensus between the methodologies readily reveals themselves. This includes the widespread use of VT0001 for additionality assessment, and the use of reference areas for baseline emission calculations when degradation and/or deforestation is avoided. Project scenario emission reductions or carbon storage are often calculated using allometric equations or biomass models based on field data from PSPs. Moreover, most methodologies agree that both activity-shifting and market leakage should be considered (if applicable). However, differences between the methodologies become obvious under closer inspection and will be discussed here.

2.3.1. Differences

The methodologies for SFM carbon accounting require different time and knowledge input. Notably, the RIL-C methodology requires a regionally-specific performance method. This includes the conceptualization of many aspects of the methodology that are pre-fabricated in most other methodologies. Given the fact that currently only one regionally-specific performance method is publicly available (for Kalimantan, with one for the Yucatan peninsula under development), project proponents will probably need to invest significant resources to apply the current VCS methodology. This might in part explain why no verified projects are yet found in the Verra registry. The development of alternative methodologies that rely less upon regional differences could help in making RIL-C a more attractive method of sustainable forest management for carbon benefits. This will partly happen upon acceptance of the Methodology for Improved Forest Management, which will link to the RIL-C methodology and is currently under development by VCS.

Moreover, methodologies differ in their data sources and analysis methods. VM0037 (REDD+) relies heavily upon remote sensing data, advanced modelling and machine learning, which signifies a considerable knowledge investment but allows for carbon accounting using less field data (although field monitoring is still needed for quantification of emission reductions). VM0015 (REDD+) and VM0010 (set-asides) mention that, although technology did not allow it at the time of publication, remote sensing data would be useful in land-use analysis. Especially projects with set-asides would benefit from using advances in using remote sensing technology for land-use analysis. Such projects tend to be expensive and impractical because accessing remote and closed-off parts of the forests for monitoring is now necessary. The use of remote sensing data will lessen this considerably.



2.3.2. Gaps in the methodologies

Despite the availability of ten methodologies, not all IFM project types can currently claim VCUs. One of the most pronounced gaps is the implementation of multiple forms of SFM in a streamlined, single methodology. This gap will be filled once the Methodology for Improved Forest Management is accepted. This methodology will also open doors to RIL-C projects without existing FSC (or other) certification.

2.4. The impact of SFM and its relation to other project types

2.4.1. The key positive impacts of SFM

In this section we zoom in on various benefits that SFM brings alongside climate benefits.

SFM as conservation strategy: forest conservation strategies for climate change mitigation cannot solely rely on protected areas, and production forests need to be part of realistic conservation strategies. In most tropical countries between 25-50% of the forests is legally destined as production or multiple use forest. The job at hand is to conserve and manage these forests sustainably for multiple benefits (FAO 2020). The *use it or lose it* principle introduced by Johnson and Cabarle (1993) indicates that forests which do not create adequate revenue will tend to disappear. In practice we see that SFM operators are often effective in preventing deforestation, conserving forest and biodiversity in their FMUs, including HCV protection and anti-poaching measures. They are only able to fulfil this role if they operate at profitable levels and have adequate economic means to finance these conservation measures.

Biodiversity: the impact of SFM on biodiversity at FMU level has been researched with mixed to positive outcomes (Zagt et al., 2010). Research has shown that in secondary and disturbed forests, carbon stocks and biodiversity are positively associated (Ferreira et al., 2018). A study that linked carbon stock enhancement directly with biodiversity found a similar positive relationship between increased carbon stocks and biodiversity for threatened and disturbance-sensitive species on small spatial scales (Deere et al., 2017).

Community: frontrunning SFM operations are known to offer community benefits when operating in remote areas where the public sector is weak and limited financial resources exist. In practice, this means that SFM companies offer not only (in)direct employment but also medical care, education, power supply, infrastructure, and for example agroforestry development. Smallholder-based SFM projects can offer community benefits through livelihood contributions from carbon payments and ecosystem services (Bond et al., 2020), although the benefits reaped do depend on the level participation of local people in a given project (Bozmoski & Hultman, 2010).

Carbon storage in timber products: sustainable use of forests and accompanying timber extractions store carbon for a certain amount of time in wood products that are produced from harvested trees. More information on carbon stored in wood products and its benefits is found in section 5.2

2.4.2. Synergies with SFM certification

Biodiversity and community benefits of SFM can be solidified by CCB (Climate, Community and Biodiversity Standards) certification. Verra offers the combination of VCS with CCB, which is streamlined through joint project document templates. When registered under VCS, the climate



requirements for CCB are already fulfilled and only the community and biodiversity requirements remain. All three components of CCB can also be certified at ‘Gold Level’, indicating an exceptional benefit to climate, biodiversity or communities respectively.

Moreover, IFM carbon credit requirements exhibit overlap with voluntary certification for responsible forest management, notably FSC and PEFC. Therefore, FSC or PEFC certified operations more easily qualify for carbon certification as they already comply with several VCS requirements. Carbon certification is complementary to FSC/PEFC. It translates into direct monetary advantages from carbon credits for projects that have demonstrated additionality. In the case of FSC or PEFC certification, benefits are more indirect as they depend on the willingness of buyers to pay premium prices for certified products and services, which is not always the case. FSC also aims to enable additional revenue generation for SFM operators through Payment for Ecosystem Services (PES) through the launch of its Ecosystem Services Procedure (ESP) in 2018.² This allows for the verification of impacts on ecosystem services in FSC forests, including carbon sequestration. Projects certified under FSC ESP can add the claim ‘verified ecosystem services impacts’ to their assets or products, but it does not result in tradable carbon credits.

2.4.3.SFM vs other forest carbon project types

In this section we compare SFM with other forest carbon project types to determine specific differentiators and unique selling points (USPs) for SFM compared to other available forest project types. VERRA distinguishes three forestry categories:

- Afforestation, Reforestation and Revegetation (ARR)
- Improved Forest Management (IFM)
- Reduced Emissions from Deforestation and Degradation (REDD+)

All forest categories are considered Nature Climate Solutions (NCS) – carbon-positive conservation, restoration, and/or improved land management actions – and are grouped and typified below for comparison with SFM. We previously established that SFM projects can be developed under IFM or REDD+ project methodologies. In this section we compare SFM with project types that are not SFM, which includes REDD+ with a pure conservation focus. We also describe community-based agroforestry/NTFP projects as a separate project category (using ARR or REDD+ methodologies), because of their different characteristics and market appearance compared to SFM projects.

Project-based REDD+ conservation projects (REDD+)

Project-based REDD+ conservation projects form the major share of REDD+ projects (no logging as part of management practices). They are typically large-scale (50% > 66.000 ha), located on public, community or private lands, and all of them are VCS (+CCB) certified. Projects have a strong relevance for large-scale forest and biodiversity protection, and often include community benefit-sharing systems. They are generally funded by donors (public/private) and carbon credits revenues. Typically, NGOs are project owners, though private companies may be involved. Credit volumes per hectare are low, but due to the project size, volumes are high. Credits are often bought up or under (investment) contract by major corporates or funds that in some cases pre-invest in projects. Carbon credits are released for avoided emissions. The baselines, additionality, carbon permanence, potential leakage, carbon rights, and solidity of applied methodologies are criticised by (E)NGOs and critical media. In some cases, doubts are raised over claimed social agreements,

² See: <https://fsc.org/en/for-forests/ecosystem-services>.



ecological impact and money flowing into private hands (Greenfield 2021a). REDD+ credits cannot be used for net zero claims by buyers, although corporate buyers and marketeers do not always realize this, resulting in critiques by scientists and NGOs (e.g. Greenfield 2021b; Stapczynski et al. 2021). This may lead to potential court claims from environmental groups.

Plantation projects (ARR)

Tree planting projects can be certified under VCS (+CCB), GS and Plan Vivo, and include projects from large private plantations companies to smaller, community and conservation focused initiatives. The median size of carbon certified reforestation projects is 2,900 ha and they generate credits that equal sequestration of CO₂ from the atmosphere over time. Biodiversity and community benefits are often part of (smaller) impact-driven initiatives, but sometimes lacking or limited in larger commercial projects. However, employment generation is high. Although the average level of sequestration per hectare is highest of all categories (20 ton/ha/y), the limited size and difficult upscaling of ARR projects limit total credit volumes. The core economic driver of projects is often not carbon, but timber or other tree products, such as rubber. This may change as demand and the price for ARR carbon credits is high.

Community-based agroforestry/NTFPs (ARR/REDD+)

Although not a clearly defined category, agroforestry/NTFP projects are of different nature than other categories. They typically have a strong social focus, working with cooperatives, farmer associations or at community level on small-holder lands where they reforest or restore land by combining trees and crops. Protection of remaining forests and avoidance of deforestation through slash-and-burn agriculture is frequently part of project goals. Sometimes, carbon funds are directly shared through benefit sharing systems with engaged social groups. A few projects use REDD, but most focus on ARR methodologies. Coffee and cacao are typical crops, but projects with fruit and nut trees are also encountered. Projects normally have multiple products and complementary cashflows over time (including donor funding in case of NGOs), carbon being one of them. Agroforestry projects can fetch the highest prices via GS and Plan Vivo certification. Projects working with NTFPs generally have NTFP-activities as a component of a broader project (often REDD+).

Sustainable forest management (IFM/REDD+)

The number of SFM projects (using IFM or REDD+) with carbon certification is limited, and all concern VCS/VCS-CCB projects. One group concerns REDD+ projects on concessions or private land, and another group are IFM projects, most of them not in the tropics. Average project area size is 47,000 ha. The level of carbon credits/ha is in between those of REDD+ and ARR projects. REDD+ and most IFM methodologies concern credits for avoidance of emissions – generally less attractive for buyers and priced lower than sequestration credits. The scale of SFM projects, however, does allow for significant credit volumes. There is no conflict with FSC certification; FSC certification supports carbon certification by demonstrating impact and sustainability of forest management, as well as engagement of stakeholders, also required for VCS carbon certification.

Understanding the landscape of NCS projects allows us to look at the positioning of SFM in this field. We have therefore rated the key market characteristics of the four project types with our team of forest experts in the following table.



Table 2: Ratings on key project characteristics of forest carbon projects

	REDD+ conservation projects (REDD)	Plantation projects (ARR)	Community-based agroforestry/NTFPs (ARR/REDD)	SFM (IFM & REDD+)
Forest protection relevance	++	-	+/-	+
Employment relevance	-	+	+	+
Community relevance	+/-	-	++	+/-
Biodiversity relevance	++	+/-	+/-	+
Contribution towards circular bioeconomy	-	+	+	+
Project owner's organisational and financial stability	+	+/-	+/-	++
Project area size	++	-	-	+
Carbon credit volumes	++	+/-	-	+
Market appreciation	+/-	++	++	+/-
Credits for offsetting (net-zero claims)	-	++	+/-	-
Storytelling potential	+	+	++	+/-

Forest protection relevance and the project owner's organisational and financial stability are SFM's strongest selling points, with biodiversity relevance, contribution towards circular bio-economy, employment generation, project area size, carbon credit volumes as other strong points. The weakest spots for SFM are community relevance (except for companies with clear community benefits) and the potential for offsetting in net zero claims, which is not possible according to current science-based target initiative guidelines. The market appreciation of SFM projects is still an unexplored area. Few projects exist in the market and storytelling potential is a topic to address by the sector (see section 6.1).

Credits from NCS are preferred in the market compared to other sectors such as energy efficiency, renewable energy and the chemical & manufacturing industry. Carbon credit buyers generally have preferences certain sectors, regions or countries, and SFM companies can seek out those clients. Ellis et al. (2019) estimates that 44% of emissions by tropical selective logging can be reduced by improved practices. According to market analysis by Forest Trends, buyer's preference goes to ARR projects for three reasons: a) surge in media coverage of tree-planting as a potential climate solution; b) ARR is easier to explain to buyers than REDD+; c) concerns over leakage and additionality in other project types³.

These are important considerations for SFM companies, as projects will be compared by buyers throughout the spectrum of Nature Climate Solutions, and ARR projects are clearly the most preferred. In Table 3 we present the key strengths and weaknesses of SFM carbon credits, and how these can be addressed/mitigated.

³ Forest Trends, 2019. Report on Market Dynamics.



Table 3: Strengths and weaknesses of credits from SFM companies

	Description	Address/mitigate
Strengths	Essential part of demanded Nature Climate Solutions	Address relation to importance of forest preservation, the role of production forest for comprehensive conservation strategies, scale of SFM needed (25-50% of forests in tropical countries), use it or lose it, and the climate link
	Scientific research points at strong emission reduction potential in SFM sector	Quantification of carbon gains and fitness with methodologies at project level, to determine certification feasibility
	Contributes to large-scale forest & biodiversity protection	Address large scale and long-term protection of ecosystems and key species, and resulting significant carbon credit volumes
	Project owner's organisational and financial stability	Address permanence of project & reduced carbon emissions. Financial sustainability allows for long-term and low-risk contracts with buyers
	Long-term, sustainable projects generating employment in local economies; positive impacts in areas with weak governance (if applicable)	Address impact on job and skill creation, as well as local economic & governance importance (if applicable)
	Ecological sustainability of forest management	Companies with FSC can address FM certification to prove sustainability of forest management
	IFM & REDD+ credits under VCS are CORSIA-approved	Acceptance by international organisations shows solidity of claims, further supported by third party audit
	Very few carbon-certified SFM projects exist, same for use of IFM methodologies. Certification shows innovative element	Address additional investment made and innovation/status of front-runners
Weaknesses	Credit revenues flowing to private corporations, not NGOs/communities, may be perceived as undesirable and unsound	Demonstrate cost of (additional) project activities; execute impact-rich and additional activities that contribute to community/ecosystem well-being
	Logging activities may be poorly perceived	Stress strategic importance of production forest in comprehensive conservation strategies (use it or lose it). FSC certification as of proof sustainability of forest management; providing insight into RIL and regenerative capacity of forest/silvicultural practices by company
	Additionality could be weak or hard to explain to public	Demonstrate additional efforts & cost in project for sustainable management
	No clear sequestration potential as with ARR, likely not eligible for net-zero claims	Credits have an equal status in the VCS registry, are CORSIA-approved, and proof credit reduction from baseline/business as usual. Other claims on e.g. contribution to forest protection and avoidance of emissions can be made



3. Current market status for SFM carbon projects

3.1. Facts

Although the area of sustainably managed forest is modest at global level (~10%), it represents 15 times the area engaged in certified carbon offsetting projects (Brûlez et al. 2018). FSC and PEFC certified forests are concentrated in the Northern Hemisphere (90%), while carbon offsetting projects of the voluntary market are mainly located in the Southern hemisphere.

An in-depth look at certified AFOLU carbon projects shows that ARR projects are most common in quantity (64%), but only make up 24% of total expected carbon credit generation. REDD+ projects are on average 15 times bigger than ARR projects (319,052 ha compared to 21,312 ha), with REDD+ credit potential per hectare at a third of ARR projects. REDD+ credits therefore dominate the AFOLU market. A total of 3.2 billion tCO₂eq of carbon credits are expected from AFOLU projects (ex-ante figures), of which 2.5 billion from REDD+ projects (Table 4). Currently, IFM projects only make up 9.0% of projects, 4.9 % in area size and 3.4% in total expected carbon credits.

Table 4: Overview of validated AFOLU carbon projects (IDRECCO 2021).^{4,5,6}

	Project type	No. of projects	Size (1'000 hectares)	Size of crediting area (1'000 hectares)	Expected annual carbon credits (1'000 tCO ₂ eq)	Total expected carbon credits (1'000 tCO ₂ eq)
Average	ARR	143	21	19	117	4,273
	REDD+	79	319	304	903	31,715
	IFM	20	74	48	213	5,433
Sum	ARR	143	2,989	2,666	16,755	611,069
	REDD+	79	24,625	23,490	71,305	2,505,488
	IFM	20	1,410	917	4,266	108,656
Grand sum		223	29,024	27,073	92,326	3,225,213

While REDD+ projects provide most volume, the amount of certified carbon credits *per hectare* is small. A typical ARR project *sequesters* 11 tCO₂eq/ha/y, while a typical REDD+ project *avoids* 4 tCO₂eq/ha/y (Table 5). The carbon credit volumes of IFM projects sit in between ARR and REDD+ projects.

Table 5: Carbon credit potential per ha for forest project categories (median values)⁷

Project type	No. of projects	Project duration (y)	Credits per ha (project area) (tCO ₂ eq/ha)	Credits per ha (credit area) (tCO ₂ eq/ha)	Credits per ha/y (project area) (tCO ₂ eq/ha)	Credits per ha/y (credit area) (tCO ₂ eq/ha)
ARR	143	43	261	266	10	11
REDD+	79	31	79	94	4	4
IFM	20	30	191	223	8	8

⁴ Data-processing & quality checks by FI. Projects include VCS (CCB), Plan Vivo, GS and CDM projects.

⁵ Wetland projects, non-validated projects, projects with incomplete or bad-quality carbon certification data, unclear project type and jurisdictional REDD+ projects were filtered to obtain most reliable statistics.

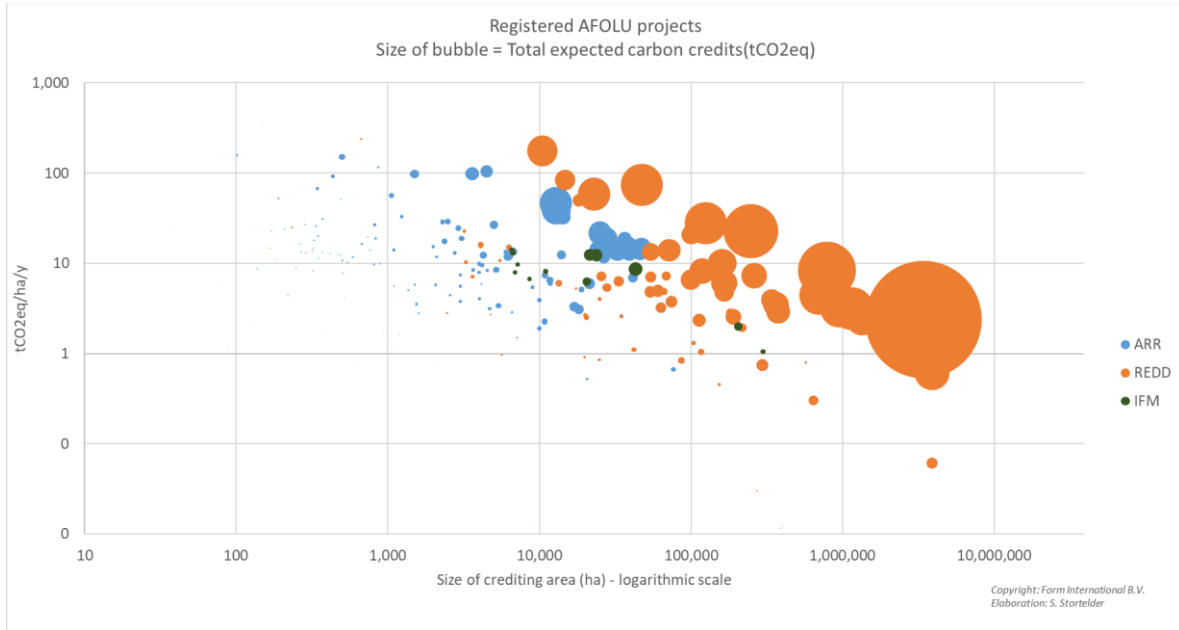
⁶ Some projects have multiple project types: REDD+ (11%); ARR (29%); IFM (50%).

⁷ Several projects had extraordinarily high carbon figures, pushing up averages. For this reason, median figures are shown – these provide a better picture of typical project figures.



Graphical representation (Figure 1) clearly shows the dominance of REDD+ in carbon credit offer, as well as the larger crediting areas compared to ARR and IFM. A high number of small-sized ARR projects exist (between 100 and 1,000 ha), which, although they generally sequester more than 10 tons/ha/y, provide little volume to the market. IFM projects sit in between REDD+ and ARR projects, but the volume is small.

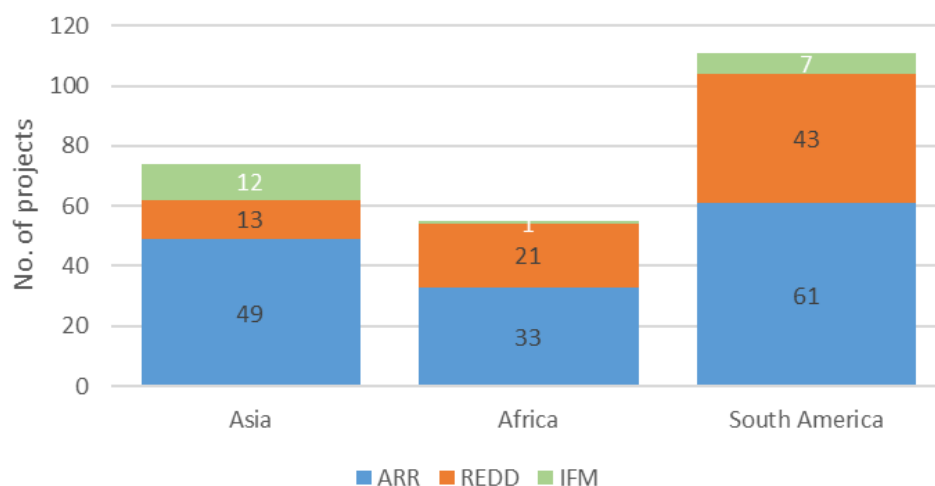
Figure 1: Registered AFOLU projects - carbon impact & size



In September 2021, the pipeline of existing projects and upcoming VCS AFOLU projects consists of 209 registered projects, 43 projects under development, 39 projects under validation, and another 27 project of which registration is requested (Verra Project Database 2021). The total annual emission reduction of registered VCS AFOLU projects is 90 million tCO2eq, with the full pipeline adding up to an additional 70 million tCO2. Of that volume 77% comes from projects using a REDD+ methodology and 7% from IFM, demonstrating that REDD+ projects will continue to be the main AFOLU carbon credit supplier to the market. South America is the region with most AFOLU projects, also when looking at REDD+ and ARR projects. Asia is the region with most IFM projects (Figure 2).



Figure 2: Number of registered AFOLU projects per region (Verra Project Database 2021).



Within IFM, the use of set-asides is the most common (13/21 projects), while use of REDD+ methodologies is diverse, except for VM0037 with zero registered projects (Table 6). Ten out of eleven Asian IFM projects have used the VM0010 methodology and concern conversion of logged to protection forests - generally evergreen and some deciduous tree species, of which at least some projects concern planted commercial forests. The one IFM project in Africa uses VM00011, and concerns the North Pikounda REDD+ project⁸ of Olam International in the Republic of Congo. In addition, we were able to identify a small number of projects in which SFM/timber companies are or were involved.

Table 6: Methodologies used in registered VCS AFOLU projects (retrieved from Verra registry)

Methodology	Methodology focus	Number of projects
REDD		81
VM0004	Peat swamp REDD	1
VM0006	Mosaic & Landscape REDD	12
VM0007	REDD	30
VM0009	REDD	11
VM0015	REDD	27
ARR		101
ARR methodologies	Afforestation, Reforestation and Revegetation	101
IFM		21
VM0003	Extended rotation length	3
VM0005	Carbon enhancement	1
VM0010	Set-asides	11
VM0011	Set-asides	2
VM0012	IFM in temperate forests	3
VM0034	IFM in Canadian forests	1
Agric/multiple/unknown		6
Grand Total		209

⁸ Although the name indicates that this concerns a REDD+ project, the project is an IFM project as it only uses an IFM methodology (VM0011).



3.2.Successes

The number of carbon projects among SFM companies is very small, but registered projects have become successful. Especially REDD+ projects have been able to generate and sell high volumes of credits.

Market access for projects is related to the parties involved and their network (project proponent, project developer, financier). Some projects sell to only a few clients. The Madre de Dios Amazon REDD+ project, on the other hand, sold credits to 214 beneficiaries. Knowing your way in the carbon market, having sufficient volumes to sell, and being flexible on prices being offered, has been important for success. For a long time, the voluntary market featured a credit oversupply. As such, those willing to accept lower prices could gain market access. The foreseen shortage of voluntary credits (see section 5.1) may lower criteria for companies desiring to acquire credits, and NCS projects may be seen as more premium. For clients going for quality projects, prices are likely to increase, providing an opportunity for serious, responsible and dedicated SFM companies with sound marketing skills.

REDD+ projects have particularly surged in Latin America. For IFM, a good number of projects are in China, with avoided logging of (plantation) forests. The quality and additionality of certain validated projects could raise doubts to NGOs, media and buyers. Assessing them on quality criteria is an assignment on its own, and outside of the scope of this study.

3.3.Constraints

Key barriers and constraints to consider when developing carbon projects for SFM are:

- Negative perceptions of public and media and some NGOs (e.g. Greenpeace) related to logging practices, and the related risk of negative media attention for company and project.
- Technical carbon argument regarding additionality/leakage/double counting (section 2.2)
- Cost-benefit of project development: development of a carbon project and having it certified has significant up-front costs. Costs include project development, staff, baselines determination, monitoring activities, contracting technical expertise, registry costs and third-party audit, and should be covered by carbon credit sales. Although we have not been able to assess cost-benefit for IFM projects in the scope of this paper, we know carbon prices have been depressed the past decade and various projects did not realize verification because of low price levels. The recent strong upward trend in demand is noted in both volumes and prices and is likely to stay. Making a positive cost-benefit case is now easier than in the past, especially for projects of significant scale.
- Potential risk of non-compliance with standards in third party validation audits or review by Verra.
- Do possibly existing or upcoming national and jurisdictional REDD+ programmes allow for voluntary and project-level carbon certification of the Forest management area, or will this impede or limit certification options?
- Does the company have sufficient technical capacity to develop carbon projects, and can the company provide required information and qualitative data for project development and monitoring?
- Existence of scientific data and research gaps for compliance with methodological requirements.



4. Stakeholder analysis

For this paper we assessed publicly available reports, statements and websites to assess stakeholder views on SFM in relation to carbon finance. We added our own experience as project developer and consultant in the forestry and NCS space (see Table 7 or a summary per key stakeholder group).

It is striking that SFM and IFM do not feature very explicitly in important forest and climate publications, position papers or debates. Large environmental NGOs (The Nature Conservancy, Conservation International, and WWF) support IFM, but it is not at the forefront of their visible efforts (See e.g. WWF 2018; Adams & Beckham 2018). Their key communication is around forest conservation and restoration without timber production. Other important actors such as (corporate) carbon credit buyers, investors, carbon advisors or project developers do engage with IFM projects, but likewise tend to communicate on conservation, biodiversity and community benefits, reforestation or agroforestry. Managed forests and logging are avoided in communications. Do these stakeholder groups reject SFM and IFM or do they not understand what it is about? We find the answer is no, there is acceptance and support among important stakeholder groups, but support is not made visible. Logging is avoided in communication, and positive press on IFM must compete with negative perceptions that are voiced more strongly. Public criticism of IFM is linked mainly to groups that reject SFM or carbon offsetting in a broader sense. For example, Greenpeace rejects carbon forestry and carbon offsetting altogether (Al Ghussain 2020).

The position of (corporate) buyers of voluntary carbon credits regarding SFM and IFM is not very clear as there are no public statements we are aware of. From our experience, views vary between buyers. Generally, they prefer NCS projects that enable storytelling around biodiversity and community benefits (which is less evident from IFM as it is more difficult to understand than reforestation or conservation) and avoid projects that bring along reputational risks. Some will keep on the safe side and avoid projects with logging components altogether, others will purchase from these projects but avoid logging in their communication. We have also come across views that buyers hesitate to 'sponsor' private for-profit companies. This is a question of financial additionality. But the tide seems to turn quickly with spurring market demand for NCS credits. We are aware of several projects and buyers that are looking at carbon deals including IFM. Under the changing supply-demand balance some of the arguments raised against IFM carbon will be reevaluated. Furthermore, the success of some existing IFM projects points to market acceptance. Thus, the bottleneck seems to be lack of supply and not unwillingness to buy.

The financial sector, as part of their strict risk avoidance and safeguard policies, have put in place restrictions on financing logging in tropical forests (e.g. through IFC Performance Standard 6, Critical Habitat clauses hamper investment in tropical forests). This restricts participation of DFIs and some larger carbon impact funds in SFM and IFM, although some investments have been made in SFM forestry companies.

As evidenced in Chapter 2 and 3, there are various IFM methodologies and successful projects on the market. However, the IFM market is small compared to other NCS project types receives little attention. We attribute this to the focus of the sector on the other project types and lagging effort for SFM or IFM. Next to this relative neglect, we sense underlying perceptions that logging is either bad or customers and other stakeholders may have negative perception. The ENGOs that do promote IFM (and particularly RIL-C) focus on benefits of IFM and meriting general support (See e.g. Mo 2019; The Nature Conservancy 2021; Griscom & Cortez 2013).



It is noteworthy that in countries such as Surinam and Gabon, ENGO collaboration with governments has resulted in the adoption of IFM (notably RIL-C) in the national Forest Reference Emission Levels (FRELs) that form building blocks for national REDD+ systems. This shows that some governments in tropical forested countries have formally embraced IFM as part of their REDD+ strategies, which is a notable achievement and can be leveraged on.



Table 7: Key views of main stakeholder groups

Stakeholder group	Key views regarding SFM and IFM
SFM operators	<ul style="list-style-type: none"> • Wish to tap into carbon finance, but cost-benefit unclear • Face lack of understanding, financial and technical barriers for project development • Access to markets and market uncertainty (who buys, what price?) • Face negative market perceptions regarding logging sector
Voluntary carbon buyers	<ul style="list-style-type: none"> • Co-benefits and storytelling are important drivers to enable demand • Conservation/restoration (without logging) and community-based projects are preferred, but SFM is part of the premium NCS market. • Avoidance of reputational risks including negative stakeholder/customer views on logging; logging is a difficult aspect to reconcile in storytelling. • Increasing interest in removals vs avoidance to align with science-based targets for net-zero claims (ARR preferred, REDD/IFM come second) • IFM is not a well-known project category, more difficult to understand than pure conservation or reforestation • If buyers understand IFM, their clients (consumers) or stakeholders may not, which drives buying decisions • Perception that carbon finance is not needed for timber companies, projects considered not additional • When IFM projects deliver appealing co-benefits, they can be attractive projects • Buyers seek projects with strong delivery capability, track record and good reputation
Carbon strategy advisors & carbon project developers	<ul style="list-style-type: none"> • Very few carbon advisors or developers promote IFM. The focus is on other NCS types with high market demand and no controversy • Some advisors advise carbon credit buying clients against projects with a logging component (motivation for this is unknown to us)
Carbon standards and sectoral initiatives	<ul style="list-style-type: none"> • Verra provides various IFM methodologies • CORSIA accepts IFM under Verra • ART TREES currently (conservatively) excludes IFM from their national/jurisdictional REDD+ standard
Financial sector (DFIs, Impact funds)	<ul style="list-style-type: none"> • Tropical forest logging features on exclusion lists blocking investments in SFM (notably IFC performance Standard 6, Critical Habitat clauses) • Some large carbon investors adhere to IFC PS and have barriers to invest in the tropical logging sector • Some high-profile impact investors have invested in SFM and have found ways to reconcile SFM investment with ESG performance standards
NGOs	<ul style="list-style-type: none"> • Some critical NGOs oppose carbon offsetting altogether (some of which also oppose conventional SFM) • NGOs that embrace carbon markets stress integrity, quality, safeguards (community, biodiversity, inclusivity, governance), holistic landscape approaches, alignment with NDCs and avoidance of double counting, leakage, rigorous baseline setting (reference levels) and permanence
Governments	<ul style="list-style-type: none"> • Seek multiple benefits from national forests, including revenues for the government itself • Growing interest and action to tap into forest carbon finance through bilateral and multilateral REDD+ arrangements • Some adoption of IFM in policies: examples Surinam and Gabon include RIL-C in Forest Reference Emission Levels (FRELs) • Openness to collaborate with private sector on REDD+ implementation and share revenues varies between countries
Research	<ul style="list-style-type: none"> • SFM carbon impact and RIL-C researched in growing number of scientific papers • Science incorporated in Verra methodologies



5. Trends and opportunities for SFM carbon projects

5.1. Carbon market trends

The rapidly growing voluntary carbon market holds market potential for SFM companies (see also section 5.3). After years of standstill, the recent growth of the market is driven by increased offsetting following the Paris Agreement and new corporate commitments to reduce emissions such as “carbon neutral” and “net-zero” claims (e.g. UNFCCC 2020). It is estimated that demand for voluntary carbon credits could increase by a factor of 15 or more by 2030 and by a factor of up to 100 by 2050. This would lead to a market worth up to USD 50 billion in 2030 (McKinsey 2021).

Nature Climate Solution projects play an increasingly important role on the market. NCSs are considered one of the best climate solutions in terms of costs efficiency and co-benefits (Trove Research 2021) and may deliver up to one-third of required emissions reductions by 2030 to meet the Paris Agreement targets (TNC 2021). NCSs include project types such as reforestation, avoided deforestation, agroforestry and improved forest management (Griscom et al. 2017). Issuances in forest-related NCS projects more than doubled each year between 2016 and 2019, and NCS accounted for 53% of the total issuances (McKinsey 2020). Forest-related NCS projects have the potential to generate USD 800 billion in annual revenues by 2050 (Vivid Economics 2020).

Increasing interest in quality carbon credits

The recent year’s corporate claims of “net zero” raise the question on the quality of carbon credits from forestry projects and the avoidance of misleading claims or greenwashing. As projects often operate within socially and environmentally sensitive contexts, carbon credits come with a higher risk. Quality assurance is an important challenge to be tackled to align stakeholders on the criteria for credible use of voluntary carbon credits. Investors and buyers on the market are aware of this and are increasingly seeking quality carbon credits with for example co-benefits and are becoming more willing to pay a fair price (EM 2021a). Carbon markets and standards are also responding to this with the development of for example the Science-Based Targets initiative, ART/TREES and the consolidation of standards within Verra.

Volumes and prices

In 2019, the “forestry and land use” category of projects on the voluntary market was responsible for 35% of credits and was by far the largest in terms of value at \$159.1M. Verra’s VCS is the biggest carbon certification scheme, responsible for 90% of forestry and land use offsets transacted in 2019. About 80% of these projects added Climate, Community & Biodiversity certification to verify co-benefits beyond carbon (EM 2021a). Prices paid for carbon credits on the voluntary carbon market are highly project, client and trade dependent. Forest projects are generally those with a relatively higher carbon price in the market, while e.g. renewable energy credits show lower prices. Generally said, smaller trades and smaller projects see higher per-ton prices and projects with additional co-benefits and impacts, such as VCS+CCB, generally also lead to higher prices. Yet, this often depends on the characteristics and specific interest of the buyer. Although the price difference between VCS and VCS+CCB credits appears to be minimal (USD 0,07 in 2019), an analysis of Ecosystem Marketplace found that co-benefits are a significant driver of price, and that the small price difference may be the result of many VCS+CCB projects being located in low-income countries



(EM, 2021a). Further, VCS+CCB projects often concern large-scale REDD+ projects and because of the large credit volumes flowing from these projects, prices are often lower.

Table 8 presents an indication of price averages for the VCS and VCS+CCB schemes, and per forestry category. The table indicates a price range between USD 2-9, with significant differences between forestry categories. The market clearly shows higher prices for both ARR and IFM credits compared to REDD+ projects. This can partly be explained by the fact the ARR projects ensure sequestration, while REDD+ projects generate carbon credits through avoided carbon emissions. Furthermore, ARR projects are more expensive in implementation than REDD+ projects, and REDD+ projects often generate very high volumes of credits, lowering its price. High price levels for IFM also underline the appetite for IFM projects in the carbon market.

Table 8: Average price and transaction volume of certification schemes and type of credits (EM 2021)⁹

Scheme/Category/Region/Project	Average price	Unit	Based on transaction volume (tCO ₂)
Per scheme (forestry and land use)			
VCS	4	USD	6,237,273
VCS-CCB	4	USD	31,105,110
Per forestry category			
Afforestation, Reforestation and Revegetation (ARR)	9	USD	5,564,811
Agroforestry	3	USD	247,915
Improved forest management	9	USD	2,906,016
Other - Forestry and land use	3	USD	7,292,522
REDD+ - avoided planned deforestation	5	USD	9,731,981
REDD+ - avoided unplanned deforestation	4	USD	22,116,247
REDD+ - combined	2	USD	932,441

The market prices of credits are expected to greatly increase in the next decade as the current surplus of the carbon market will turn into a deficit due to the expected increase in demand. Recent estimates find that prices may rise to USD20-50 per metric ton of CO₂ by 2030 and more than USD40 by 2040 (Trove Research 2021).

CORSIA

In addition to the trends described above, the UN Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is also expected to have major influence on the carbon market. CORSIA is a global offsetting program signed in 2016 by 192 countries administered by International Civil Aviation Organisation (ICAO). Under the scheme, countries have committed to carbon neutral growth from 2021 to 2035. Implementation of this scheme is phase-wise, with a first opt-in phase from 2021 to 2023 and with the 2019 period as a baseline. Several voluntary carbon standards are recognised under CORSIA, including IFM & REDD+ credits under VCS (ICOA 2019; 2021). From 2035 onwards, ICOA expects that 333 tCO₂eq of offsets per year will be required to achieve compliance with the scheme, which will drive the need to supply carbon credits to the voluntary market and

⁹ Latest Ecosystem Marketplace reports and online database, with prices reported for 2019.



forms an opportunity for growth of the (voluntary) carbon markets and for credits from the forestry and land-use sector (EM 2021a).

5.2. The role of SFM in a circular bioeconomy

Currently, SFM companies place little focus on the benefits of their wood products in a circular economy and the fact that they produce natural, environmentally friendly products that store carbon. Wood products from SFM clearly fit within the principles of the low carbon “circular bioeconomy”, an economic model in which resources are (if possible) renewable, sustainably managed, recovered and reused. The model is gaining momentum as it is considered a good response to sustainability issues, while meeting the needs of society (WBCSD 2020). The forestry sector is a key sector in the transition to such an economic model as wood is a versatile raw material which is renewable, reusable and recyclable (UNECE 2021).

Wood is also one of the few building materials that can be grown naturally and stores carbon for the duration of its lifetime (Bellassen & Luyssaert 2014). It therefore has a positive impact on the carbon balance, as opposed to other materials such as cement and steel that cause a high amounts of CO₂ emissions (See e.g. Graham-Brown 2021; Lehne & Preston, 2018). Due to new innovations, wood is being used in novel ways in construction materials, textiles, packaging, and as vehicle components. Innovation of wood applications are expected to accelerate, and wood may replace and complement fossil-based materials in many industries (Kohl et al. 2016). By swapping carbon intensive building materials for sustainably sourced wood sources, a new carbon pool can be created when wood products are in long-term use (Naturally:wood 2021). At present, existing and upcoming methodologies present little to no openings for monetizing carbon pools in long-existing wood products. New and updated methodologies may bring new opportunities here.

The planned “EU carbon tax” could however turn the carbon-benefits of timber use into a strong economic incentive to the SFM sector in another way. In July 2021, the European Commission presented its plans for a carbon border adjustment regulation, which is a mechanism that would tax products imported into the European Union based on the greenhouse gases emitted to manufacture them. The mechanism will first apply to polluting industries - steel, aluminium, cement, fertilisers and electricity – and will add more sectors over time. The Commission plans to have a transition phase between 2023 and 2025, and to implement the border tax from 2026 onwards. Importers will need to buy digital certificates representing the tonnes of CO₂ in the goods they import. The prices of these certificates will be based on the average price of permits in the EU-ETS market, which hit a record high of 62 euros/tonne in September 2021 and which are expected to rise until 2030 (ISSD 2021).¹⁰ Higher taxation of polluting materials will increase the economic competitiveness of wood as building material to be imported into the EU. As wood products from SFM can be carbon neutral or net-carbon positive, a CO₂ border tax would improve the competitive advantage of timber over other construction materials.

At global scale, such developments may put further pressure on existing wood sources. Global timber consumption has already increased annually by 1.1% over the last 20 years and is expected to increase to an annual 3.1% over the next 30 year, driven by urbanisation and population growth and the increased use of woody materials (Gresham House 2020). Hence, the case for sustainable management of forest resources and a sustainable wood supply is more urgent than ever.

¹⁰ See recent prices at: <https://ember-climate.org/data/carbon-price-viewer/>



A more forest-based economy means there is a need for more forest and better managed forests with a focus on carbon storage and other social and environmental benefits on the one hand, and the sustainable use of forest areas for wood production on the other. **Calling attention to the role that wood and forests can play in a circular bioeconomy and in carbon storage, as well as the need for sustainably sourced wood is a good position for SFM companies to take.**



5.3. Opportunities for SFM on the carbon market

5.3.1. Carbon certification potential & advice to SFM companies

An opportunity for SFM on the voluntary carbon market

As the demand for NCS and credits increases and prices go up, there is opportunity for SFM companies to step into the market and supply the market with credits from SFM practices (see e.g. NewForests et al 2021). Also, as demand for NCS is expected to exceed the supply of these types of projects, it is likely that buyers of these credits will look beyond traditional conservation and reforestation projects and become more inclusive/accepting of other project types such as improved management practices from SFM. Increased prices and demand for carbon credits will lead to a more financially attractive business case for SFM companies to engage in IFM carbon projects, and conserve, or enhance more forest areas. **Certifying SFM concessions under the VCS standard in combination with CCB holds most potential for SFM companies and can be the way forward to upscale IFM practices and highlight additional benefits and quality of IFM credits.**



Available methodologies and certifiable activities

The analysis of the existing and developing IFM carbon accounting methodologies and their benefits in Chapters 2 and 3 shows that there are sufficient tools and methods that allow SFM companies to get certified carbon credits from their concessions. There is a largely unexplored opportunity, considering the increasing voluntary carbon credit demand. **SFM companies, and the sector in general, could focus on working with these already existing methods, while keeping their constraints in mind (see Chapter 3). In doing so, the sector can set more examples of SFM projects and develop best practices of SFM on the carbon market, which are currently still limited.** Improvements in methodologies that increase efficiency and applicability of SFM are under way and should be closely monitored by SFM companies so they can use and benefit from these developments. **Investing in carbon feasibility studies, alignment with government (REDD+) projects and carbon project development and certification is highly recommended.**



Although IFM activities are closest to the core business operation of SFM companies, the carbon certification potential for SFM companies is not limited to IFM activities and methods, such as set-asides, increased rotation lengths and carbon stock enhancement. A few companies were for example able to REDD+ certify SFM forests. **It is therefore recommended to conduct carbon feasibility studies and carbon certification studies of both new and existing management practices. Re-investment of carbon revenue streams in carbon and impact-related activities are also highly recommended to ensure additional impact towards carbon clients.**



Beyond SFM, those companies exploring or undertaking reforestation activities (to reduce the reliance on natural forest timber) are strongly advised to analyse carbon certified (ARR credits) as an additional income stream. It allows for cash-flows before plantation timber can be harvested, and ARR credits are among the most appreciated in the voluntary carbon market. The addition of



an agroforestry/NTFP value chain as part of a wider social landscape project and REDD+ certifications can also be considered. Carbon can generate revenues streams to blend with other revenue streams (agroforestry or NTFP product sales, donor funds) to ensure long-term financial sustainability of landscape activities.

SFM and the connection to the NDCs/national REDD+ strategies

Although the main market potential for SFM is on the voluntary market, **the SFM sector should keep an eye on the national developments on the carbon market as part of countries' NDCs.** IFM is increasingly taking place in areas that are part of larger national REDD+ strategies, which poses the problem of potential double counting of carbon credits and conflicting carbon claims. Buyers on the market are seeking the assurance that they are not buying credits that may result in future double counting and want to see projects that are recognised and accepted by the government. SFM companies cannot work in silos outside of the national efforts to reduce emission. The carbon emissions of projects can for example be carved out of the NDCs or projects can obtain the rights to sell the carbon from the government. On the other hand, projects can also become part of the larger strategy through the “nesting”.¹¹



While most governments are not ready for nesting, in many tropical forest countries REDD+ strategies are underway and SFM companies should carefully consider this when trying to certify their land. SFM companies can look at partnering with the government efforts to reduce emissions and can consider the development of public-private partnerships with governments in which SFM companies can contribute to national REDD+/NDC efforts through IFM. In return for their efforts, SFM companies can receive a revenue share on the carbon benefits. On the other hand, in case SFM concessions are geographically part of national REDD+ programmes, certification of additional activities that fall outside of a national REDD+ scope or timeframe can be analysed for certification.



5.3.2. SFM's position within NCS

Considering the positive carbon impact of SFM, the available carbon accounting methods, and the growing need for credits from NCS on the market, there is a clear case that SFM projects should form a project category within NCS. In section 2.4, various benefits of SFM were highlighted and it was seen that, under the right management, concessions contribute to large-scale forest and biodiversity protection and the creation of social benefits by creating direct and indirect employment.

In their positioning, SFM companies could focus on promoting these benefits as well as pointing out the size of forestry concessions and the scale of production forests in the tropics. Operators in the tropics usually have very large areas under management (50,000 – 1,200,000 hectares) and as mentioned around 25-50% of forests in tropical countries is legally assigned as production forests. This opposed to an estimated 10-15% of forest land that governments usually place under protected areas makes inclusion of managed forests in NCS of paramount importance in achieving the Paris goals. Taking these forests largely out of production is not a viable option as there is an increasing demand for wood and governments have designated production forests for economic, social and multiple purposes.



¹¹ For an explanation of jurisdictional and nested REDD+ see e.g. <https://verra.org/project/jurisdictional-and-nested-redd-framework/>



Considering the vast size of these areas, bringing productive forests under sustainable and improved management can have huge positive impacts on forest and biodiversity protection as well as carbon storage. SFM can help to meet the (economic) development needs of governments in a way that secures biodiversity, soil and water protection and the protection of other ecosystem services. However, operators who want to sustainably manage their concession and create benefits, also need to remain economically viable and may need additional finance to support SFM operations. It is therefore key that the sector is included in NCS finance for the benefit of climate and people, and this is precisely the position that SFM companies and IFM could take.

SFM companies can emphasize that by leaving out SFM, carbon investors and buyers are ignoring significant tracts of forest in the tropics which face deforestation/degradation as real potential alternatives. We cannot afford this in the global fight against climate change. Rather, we should use climate finance to the benefit of SFM and ensure that SFM reaches much wider adoption.



5.3.3. Buyer/investor education: addressing the negative perceptions about SFM

Using the various arguments presented in the positioning above, the SFM sector will need to find suitable ways in which they can educate buyers and investors, as well as the larger public on their positive impact. Media and positive storytelling are important tools to improve perceptions. Recurrent negative projections of SFM in popular newspapers like the Guardian damage the credibility of SFM, while little is being written on the positive impacts of SFM.

Storytelling on SFM should give insight into the facts, benefits and perspectives of SFM and the forestry sector in general. It should focus on the arguments above, highlighting that most forest in the tropics are production forests and that under sustainable management positive social and environmental benefits can be obtained. Making this visual through images (showing standing natural forest of SFM concessions next to non-SFM managed deforested areas), can help conveying this message. Further, companies should check on which benefits of their operations they want to place their focus in storytelling. This requires more attention for impact monitoring and reporting. The conservation of key fauna or the creation of positive social impacts are particularly attractive stories for media coverage.



This message, supported by additional research on SFMs impact, certification, and possibly a partnership with an NGO that supports SFM could be a starting point for SFM companies to engage in the conversation with parties that are against carbon credits from SFM, or with parties that are currently uncertain on the role and position of SFM within the market.

Activities that support transparency and advocate the positive message of SFM companies are already in place. Examples of this include ATIBT's Fair&Precious brand that promotes the development of a sustainable, ethical and legal tropical timber sector through certification (FSC/PEFC). Other examples are the Sustainability Policy Transparency Toolkit (SPOTT), an online platform which assesses, amongst others, timber and pulp producers, processors and traders on their organisation, policies and practices related to ESG issues; and the FSC Impact dashboard in which the effects of FSC certified forests can be compared to non-certified forest areas. Building on these existing platforms through further promotion, or by connecting these platforms to positive impact stories and best practices of SFM on the carbon market can be another way forward to promote the image of the SFM sector. Important is to be open and transparent about the overall positive impact of SFM, and in particular on the climate and carbon relevance towards media.



6. Success factors, conclusions and next steps

6.1. SFM sector level

Already, there are a good number of methodologies the SFM sector can make use of, all part of Verra's VCS. Demand of voluntary credits is expected to boom, particularly from Nature Climate Solutions, of which the SFM sector is a part. At the same time, scientific research highlights the emission reduction potential of improved practices. Carbon credits from the SFM sector will be principally for avoidance of emissions, in line with those of REDD+ projects. Emission reductions from avoidance form a more criticized segment of the voluntary credit market, but they are at the same time globally accepted (including CORSIA) and form the lion's share of current and future forest credits. It appears that (potential) demand for credits from SFM companies is, above-all, restricted by the limited number and volume of credits of currently available (tropical) IFM projects, rather than strong doubts in the market on quality or additionality of IFM projects. We attribute this low number of projects to a lack of awareness, financial and technical capacity constraints, which stem from the immature state of the IFM carbon subsector, weak carbon pricing and demand over the past decade that affected the uptake of IFM as a business opportunity.

From this perspective, the SFM sector's first task is to acquire broader and deeper knowledge on carbon certification options and re-analyse the feasibility of projects – for which the dissemination of this paper within the sector can be a possible aid. International timber trade organisations such as ITTO, ATIBT, certification scheme owners (e.g. FSC), as well as multilateral organisations (FAO, World Bank) and supportive NGOs (WWF, TNC, CI) can be triggered to support this opportunity for the SFM sector, realize studies in cooperation with academia, promote new projects and publish news articles on the topic. The key is to get to science-backed, high-quality methodologies and projects where additionality and impact is demonstrated beyond doubt. This will also be important for lobbying activities at national or international regulating and standard-setting bodies.



In terms of positioning and USPs we have pointed to SFM's pivotal role in conserving forests and to realising the NCS potential in a market that rapidly requires high volumes of credits. Carbon markets and NCS strategies cannot do without SFM. SFM's strengths can be communicated better, and weaknesses mitigated (see section 2.4). **We sense that with carbon markets being most responsive to SFM's contributions to forest conservation, biodiversity and community benefits, the key storytelling focus should be on those elements.**



On the technical front, methodology development will be important to realize to cost-effective monitoring and carbon accounting, and widely applicable methodologies. Exploration of new technologies, in particular remote sensing, is highly recommended, as noted by Griscom and Cortez (2013). The upcoming *Methodology for Improved Forest Management*, currently under review by Verra, may open a new window of opportunity and advances in remote sensing already enable new methodologies that are currently not yet part of all approved methodologies.



As a sector, addressing the need for high-quality IFM projects that are clearly additional, have community relevance, and where carbon permanence is beyond doubt, is imperative. SFM companies will of course be free to develop their own projects and validate them, and technical documentation is freely available through the Verra registry. However, **having an additional and central portal or platform designed for registered, high-quality-checked SFM companies could be**



helpful. This can provide the additional transparency and openness for such projects that is currently lacking and provide a space for Q&A open to credit buyers, media and public. This could help to convey the story the SFM sector is convinced of: sustainable logging can help protecting large swaths of tropical forests from being converted or gradually degrade.

6.2. Company level

Lack of awareness of carbon opportunities, technical complexity and the considerable high upfront costs of carbon project development and certification has been a major barrier for SFM companies to pursue carbon certification. The bullish carbon market, however, is quickly moving the lever of cost-benefits to the positive side.

For SFM companies, addressing both the strengths SFM practices, as well as mitigating weaknesses, in comparison with other Nature Climate Solution projects, is key (see section 2.4). At company level, community relevance is often one of the major weaknesses. Carbon finance can be used to shore up sustainable practices, such as full application of RIL and increasing the share of set-aside areas. Some SFM companies are not used to having larger, impact-focused programmes that address social development and well-being in their region of action. Creating impact and stimulating sustainable land-use practices among social groups to avoid wider landscape degradation, as well as benefit-sharing systems, will be important for demonstrating community impact and contribute to positive and monetizable emission reductions. Carbon revenues could be partly used for such programmes. **In line with success factors for the SFM sector, it is necessary to a convey a convincing and truthful story, with demonstrable project activities that hold clear benefits for community and environment. In direct buyer contacts the ability to deliver, track record and reputation should be emphasized strongly as this is not always present in other carbon projects.**

Lastly, incubator funds or carbon-backed credit and technical assistance mechanisms that help SFM companies to pre-invest in the relatively high upfront costs of carbon certification, could strongly support SFM companies to obtain carbon certification and access the quickly growing carbon markets.



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Appendix 1: Summary overview of carbon accounting methods

Carbon stock enhancement

Carbon stock enhancement within SFM is represented by restoration of degraded natural forests through enrichment planting and vine cutting. Both activities aid regeneration (and thereby carbon sequestration) of degraded forests. Carbon stock enhancement can also be achieved through prevention of relogging, resulting in avoided emissions from timber harvesting. VERRA offers one methodology for carbon stock enhancement: *VM0005 Methodology for Conversion of Low-productive Forest to High-productive Forest, v1.2*. VM0005 is applicable to areas where legal logging was taking place before the project start date and where normal regrowth is unlikely due to the establishment of competing herbaceous species after logging. This methodology specifically caters for tropical forests, where ample *a priori* field measurements are not always readily available, by offering various baseline emission quantification options. Baseline emissions may be substantiated through non-spatial data of pre-logging forests, such as logging plans and legal documentation from the project site or a reference area. They may also be assessed through the determination of carbon stocks after re-logging in a reference area. These options may be combined and can be implemented based on the project's needs. With-project emissions can thereafter be calculated from field measurements in PSPs.

REDD+ including logging

REDD+ projects can include a variety of activities aimed at emissions reductions from avoided deforestation/degradation. This can be the avoidance of deforestation through the implementation of SFM in a logging concession. The forest remains standing, and emissions are reduced. There are five available methodologies for carbon accounting of REDD+ project activities under VCS. They allow for various project types (mosaic, frontier, grouped, REDD+ + ARR, forests on wetlands, planted forests, agroforestry and planned or unplanned deforestation/forest degradation projects), which influences the tools and methods used to calculate emissions. Yet, similarities occur. Baseline scenario emissions in all methodologies are calculated using a reference or proxy area. Although precise methods differ, data from sampling plots and/or remote sensing is used as direct input for carbon stock equations, or to estimate parameters that feed a biomass model. Additionality is generally determined through the *VT0001 Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities*. VM0007 is the exception and uses the *CDM Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities*, which is similar to VT0001. Both use investment analysis, barrier analysis and common practice analysis. VM0007 stands out as a modular approach to carbon accounting through the combination of existing tools and VM0037 differs from the other REDD+ methodologies through its advanced models and analytics during stratification and baseline emission assessment, including the option to use machine learning applications.

RIL-C

The application of Reduced Impact Logging is considered best practice in SFM with significant economic, ecological and carbon benefits compared to conventional logging (e.g Bicknell et al., 2014; Prudente et al., 2017; Ellis et al., 2019). RIL activities can be catered to carbon benefits: RIL for Climate (RIL-C). RIL-C activities include narrower haul road construction, skid trail planning,



directional felling and improved felling and bucking for waste reduction. These activities are aimed at emission avoidance through minimization of stand damage and decreasing wood waste, thereby maximizing timber production efficiency. The emission difference between RIL-C projects and conventional logging projects can be translated to carbon credits.

VCS offers this through methodology VM0035. It reflects a broad framework for emission reduction calculations from RIL-C, which relies on information from regionally-specific RIL-C performance methods. Most other VCS methods for SFM rely heavily on CDM tools and contain methods for credit calculations in the methodology regardless of specific regional requirements. Thus far, only one regionally-specific performance methods has been developed: *VMD0047 Performance Method for Reduced Impact Logging (RIL-C) in East and North Kalimantan*. A second one for the Yucatan peninsula is under development. When a project proponent wants to implement VM0035 in another region, new performance methods will need to be developed, including the design of additionality requirements and baseline scenarios selection, as well as the calculation of regionally-specific impact parameters and functions. This signifies a significant effort, requiring expertise on carbon accounting and forest monitoring.

Set-asides

Set-asides are parts of concessions that are spared from (re-)logging for the purpose of biodiversity and/or carbon stock conservation, amongst others. Reductions of forest carbon loss due to avoided logging in these set-asides can be translated to carbon credits. VCS offers two methodologies to do so, VM0010 and VM0011. VM0010 uses straightforward methods to calculate baseline emissions. Allometric equations based on tree data from monitoring plots are used for project-scenario emission quantifications. Additionality is determined using the VT0001 tool. VM0011 is largely comparable and can be used for the same project types as VM0010. It makes more references to the use of remote sensing data for e.g. stratification. Differences between the methodologies include the allowance of VM0010 for carbon accounting for forest infrastructure, while VM0011 facilitates carbon accounting for fuel emissions from project design and associated travel. Moreover, VM0010 prohibits activity shifting within the area of the project proponent, while VM0011 accounts for this. Overall, these methodologies use comparable methods, are detailed and require minimal creative input from the project proponent.

Increased rotation length

Increasing the rotation length in a logging concession allows for a longer period of carbon sequestration between logging events. Thus, given a stable logging intensity, increased rotation length will avoid emissions compared to the baseline. VERRA provides one methodology to account for such emission avoidance: VM0003. The methodology is only applicable to projects that are already FSC certified. Baseline analysis is rigorous and includes the consideration of many scenarios. Baseline emission estimations are not based on historical data or a reference area, as is the case for most other considered methodologies. Instead, the methodology lays out equations depending on parameters from peer-reviewed forestry models. Compared to methodologies requiring field or remote sensing data from a reference area, this will signify a smaller time and financial investment. Additionality is determined through *UNFCCC CDM Tool for the demonstration and assessment of additionality*, which is comparable to VT0001. VM0003 does not accommodate the estimation of activity-shifting leakage. Instead, this leakage type is not allowed.



Fire management

VCS includes one methodology for fire management: *VM0029 Methodology for Avoided Forest Degradation through Fire Management, v1.0*. VM0029 is only applicable to the Eastern Miombo Woodlands and accounts for the regulation of fires in the early dry season when the climate is cooler and fuel moisture levels higher than in the late dry season. This lowers the mortality of large trees, and thereby the lowers emissions. Due to the limited geographical range of this methodology, it exceeds the scope of this document. It is therefore discussed in no further detail.

Methodologies under development

In addition to the methodologies for SFM in natural forests, two proposed methodologies applicable to SFM are awaiting VERRA's approval:

Methodology for Improved Forest Management

This methodology aims to be broadly applicable to all project activities that fall under IFM worldwide, multiple of which may be implemented under one project. It leans on standardized approaches for additionality and baseline determination, and on the estimation of carbon stock changes from PSPs instead of net carbon stock measurements, thereby improving accounting precision.

The approval of this methodology would mean a huge step in the applicability of carbon accounting for IFM as it is subject to few conditions. It is not limited to geographical region, (non-)working forests or any natural forest type, and no FSC certification is required. Allowed activities include RIL-C, enrichment planting, release of natural regeneration, stand irrigation/fertilization, reduced harvest levels, extended logging rotations, set-asides and fire management. These factors will make this an attractive option for a wide range of forestry companies. However, the broad and easy applicability could result in a loss of quality assurance in SFM projects.

Performance Method for RIL in Tropical Moist Forest of the Yucatan Peninsula

This is a region-specific performance method for VM0035. Alongside the Kalimantan performance method, this will be the second available performance method upon approval.



