CGIAR

RESEARCH PROGRAM ON
Forests, Trees and Agroforestry

FTA HIGHLIGHTS OF A DECADE
2011-2021

Sustainable Value Chains, Finance and Investment in Forestry and Tree Commodities

Ten years of
forests, trees and agroforestry
research in partnership for
sustainable development

About the FTA Highlights series

This publication is part of a series that highlights the main findings, results and achievements of the CGIAR Research Program on Forests, Trees and Agroforestry (FTA), from 2011 to 2021 (see full list of chapters on the last page).

FTA, the world's largest research for development partnership on forests, trees and agroforestry, started in 2011. FTA gathers partners that work across a range of projects and initiatives, organized around a set of operational priorities. Such research was funded by multiple sources: CGIAR funders through program-level funding, and funders of bilateral projects attached to the programme, undertaken by one or several of its partners. Overall this represented an effort of about 850 million USD over a decade.

The ambition of this series is, on each topic, to show the actual contributions of FTA to research and development challenges and solutions over a decade. It features the work undertaken as part of the FTA program, by the strategic partners of FTA (CIFOR-ICRAF, The Alliance of Bioversity and CIAT, CATIE, CIRAD, Tropenbos and INBAR) and/or with other international and national partners. Such work is presented indifferently in the text as work "from FTA" and/or from the particular partner/organization that led it. Most of the references cited are from the FTA program.

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FTA HIGHLIGHTS OF A DECADE 2011-2021
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FTA HIGHLIGHTS OF A DECADE
2011-2021

Sustainable Value Chains, Finance and Investment in Forestry and Tree Commodities

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The final content remains the sole responsibility of the authors.

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List of acronyms

CIFOR	Center for International Forestry Research
CIRAD	Agricultural Research Centre for International Development
CoAs	Clusters of Activities
DEVCO	European Commission Directorate-General for International Cooperation and Development
ESG	Environmental, social and governance (criteria)
FFBs	Fresh fruit bunches
FLEGT	Forest Law Enforcement, Governance and Trade
FSC	Forest Stewardship Council
FSP	Financial Service Provider
GLF	Global Landscapes Forum
GPSNR	Global Platform on Sustainable Natural Rubber
GSA	Global Shea Alliance
IUFRO	International Union of Forest Research Organizations
ITTO	International Tropical Timber Organization
MINFOF	Ministry of Forests (Cameroon)
MSP	Multistakeholder platform
RSPO	Roundtable for Sustainable Palm Oil
RWE	Roundwood equivalent
SME	Small and medium enterprise
SPO	Smallholder producer organization
SVLK	Sistem Verificasi Legalitas Kayu (timber legality assurance system)
USD	United States dollars
VPA	Voluntary Partnership Agreement

Executive summary

The growth of the global and domestic trade in agricultural and forest (primarily timber) commodities over the past decade has driven an expansion of their production, a significant portion of which takes place in tropical lands. This is leading to a significant increase in environmental impacts that are linked to deforestation and forest fragmentation, biodiversity loss and rising carbon emissions. Negative social impacts are also increasing; they include threats to local food and nutrition security, and to the tenure rights of Indigenous Peoples and local communities. Positive impacts include support for the livelihoods of the smallholder farmers who depend on commodity crops.

FTA's research on value chains, finance and investments has focused on supporting transitions to more sustainable and inclusive supply chains and business models while helping to achieve broader objectives of low-emissions development and climate change mitigation and adaptation in production landscapes. The emphasis has been on addressing the challenges associated with deforestation and forest degradation and the conversion of biodiversity-rich agricultural and forest landscapes, while meeting growing global demands for food, feed and fibre from sustainable sources. During the past decade, the emphasis of FTA analyses has shifted to embracing different types of suppliers — from small- to large-scale loggers and farmers — and to linking the impacts of global trade and investments to state- and market-driven responses in order to address their socio-environmental impacts from the subnational to the global level. The latter topic led to FTA research on inclusive business models and responsible finance.

Following the cascade of pledges and commitments in the context of the New York Declaration on Forests adopted in 2014 (NYDF 2021), FTA research has placed growing emphasis on examining the role of private-sector actors in achieving their commitments, and on identifying improved public-private arrangements to enhance the governance of supply chains, notably for palm oil, timber, cocoa and beef. This has encompassed approaches linked to the implementation of sustainability standards to reduce negative environmental impacts, and growing interest in analyzing jurisdictional approaches and gender in value chains as part of broader efforts to mainstream gender in research (Elias et al. 2021).

The wood comes from the forests but also the UTB (government processing unit), sawmills and community forests and unknown sources. Yaoundé - Cameroon.

Photo by Ollivier Girard/CIFOR

1. Introduction

The growth in the production of agricultural commodities such as soybean, palm oil, cocoa, coffee, rubber, beef and timber, stimulated by domestic and global trade, has put increasing pressure on forests across landscapes in the tropics and subtropics of Latin America, sub-Saharan Africa and Southeast Asia (Table 1). This has led to multiple environmental challenges linked to losses in forest cover and biodiversity and to rising carbon emissions (Ruckelshaus et al. 2020; Schmeller and Bridgewater 2016; IPCC 2020; Wardell et al. 2021). It has also presented social challenges, including threats to local food and nutrition security and tenure rights and to the livelihoods of Indigenous Peoples and local communities (see, for example, Lambin and Meyfroidt 2010; Reboredo 2013; Lee et al. 2014; Baker and Spracklen 2019).

While there are diverse estimates of these effects, recent analysis shows that these commodities, including cattle and wood fibre, accounted for 26% of global loss in tree cover from 2001 to 2015 (Curtis et al. 2018); almost a half of that total was linked to cattle raising (Goldman et al. 2020; Weisse and Goldman 2021).

Research on the impacts of trade and investment on forests and people, at the start of FTA Phase I in 2011, grew out of a research domain established by CIFOR in 2009. It initially focused on the informal domestic and international timber trade, the social and environmental impacts associated with the expansion of bioenergy feedstocks, the governance of palm oil,

Table 1. Estimated volumes of global trade in key commodities, 2012–13 and 2018–19

Commodity	Palm oil (million metric tons)	Soybeans (million metric tons)	Cocoa (thousand metric tons)	Coffee (arabica) ('000 x 60kg bags)	Natrual Rubber (million metric tons)	Timber (million m^3)
2012–13	56	269	3.759 (2005–06)	70.484 (2005–06)	6.8 (2000)	1.408 RWE
2018–19	74	360	4.824 (2019–20)	94.826 (2019–20)	13.6 (2019)	1.465 RWE

Sources: https://www.statista.com/ RWE = roundwood equivalent

Chinese investments in agriculture, forestry and mining in sub-Saharan Africa and large-scale land acquisitions in Papua Province, Indonesia. A first theory of change was developed in 2013.[1] For more information about work on theory of change conducted within FTA, please see Highlight No. 17 in this series (Belcher et al. 2021). In 2015, the research programme was renamed Global governance, trade and investment, and later in 2016 was renamed again as Sustainable Global Value Chains and Investments. At that time the focus shifted to assessing two topics: i) investment strategies and business models; and ii) governance systems and institutional arrangements, known as Clusters of Activities (CoAs). The research adopted a more complex framework than the former simplified approach, which was related to drivers, impacts and responses. It focused on palm oil, beef and timber supply chains in the Amazon, Congo Basin, Mekong River Basin and Southeast Asia. Researchers engaged with multiple approaches to policy engagement, including global multistakeholder initiatives, private-sector platforms, national economic, planning and environmental agencies, and subnational governments.

Several commodity round tables, company alliances, and partnerships between non-government organizations (NGOs) and corporations emerged to deal with these initiatives. The impacts were manifested beyond specific supply chains and production landscapes, and acquired global proportions. There are now multiple approaches to support sustainability initiatives and their implementation frameworks, which also relate to how supply chains are structured (Rajeev et al. 2017; Agrawal et al. 2018; German et al. 2020;

[1] A theory of change provides a description and explanation of how and why an activity or a set of activities (such as a project or program) is expected to lead or contribute to a process of change.

Wardell et al. 2021). Efforts increasingly aim to de-link deforestation from supply chains (Climate Focus 2016). This has stimulated several global agribusiness companies to make political commitments to zero deforestation (Pirard et al. 2015a, 2015b; Jopke and Schoneveld 2018). Some governments in consumer countries, notably the United States and in the European Union, have introduced regulations to restrict imports of timber and biofuels that do not comply with legal and sustainability standards, while some financial service providers are integrating environmental, social and governance (ESG) criteria in the US and EU. Many initiatives emerged in support of these processes. They include tools to make information on trade flows more transparent (e.g. TRASE and TRASE Finance); frameworks to guide companies to implement their commitments with integrity (AFI and CDP 2020); and guidance to companies to set ambitious targets for climate and nature such as the science-based targets initiative (https://sciencebasedtargets.org).

During the period 2015 to 2020 a large number of companies made commitments to address commodity-driven deforestation, and to provide publicly available reports on progress. Furthermore, 95% of companies participating in groups such as the High Carbon Stock Approach, Tropical Forest Alliance 2020 and the Tropical Forest Trust adopted such commitments (Donofrio et al. 2017). However, setting and reporting on specific, measurable and time-bound commitments and policies to eliminate deforestation and other forms of ecosystem conversion associated with agricultural and forestry production systems have progressively become more complex. Commitments on palm oil,timber and pulp and paper continue to lead the way due to their well-established certification programs.

A woman drying coffee beans in Tri Budi Syukur village, West Lampung regency, Lampung province, Indonesia.

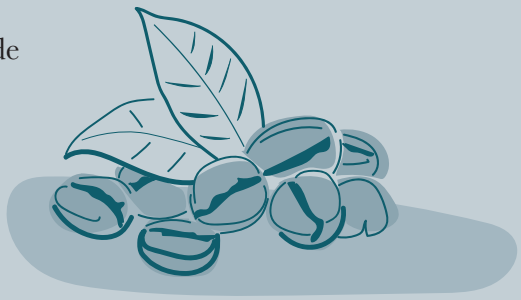
Photo by Ulet Ifansasti/CIFOR

In response to these changes, a new theory of change was developed for FTA Phase 2 in 2017 for Flagship Program (FP) 3 (Sustainable value chains and investments). It included three clusters of activities (CoAs): governance of commodity supplies, inclusive business models in timber and tree-crop value chains, and responsible finance and investments. This approach reflected the growing complexity of global markets and the multiple public and private initiatives to promote sustainability, including zero-deforestation commitments. FTA research continued to pay particular attention to promoting the inclusion of smallholders and small and medium enterprises (SMEs), while exploring governance and financing arrangements with subnational jurisdictions and at the landscape scale. Gender was increasingly mainstreamed in FTA research on value chains and inclusive business models (Box 1).

For more information about research work on gender conducted within FTA, see Highlight No.15 in this series (Elias et al. 2021).

Box 1. Gender-responsive sustainability standards

FTA gender researchers were commissioned by Fairtrade International in 2019 to analyze the gendered dimensions of participation in Fairtrade coffee value chains in Indonesia, Guatemala and Kenya, and the ways in which the benefits of certification were affecting gender dynamics within smallholder producer organizations (SPOs) and producer households. FTA Priority 16 (inclusive finance and business models)[2] provided additional support to the study to assess the ways in which gender-responsive sustainability standards affect access and inclusion by SPOs, social and economic empowerment, equitable benefit sharing, and gender transformative change. The results of the study were presented in workshops with producers through dialogues and gender transformative games, internally to the Fairtrade monitoring, evaluation and learning network, and publicly to the Fairtrade International webinar series and FTA Science Conference (Gallagher et al. 2020).



[2] https://www.foreststreesagroforestry.org/research/fta-priorities/.

FTA played an active role in communicating research results at multiple forums and with a diverse array of stakeholders throughout the period 2011–2021. During Phase I this focused on engagement with the European Commission Directorate-General for International Cooperation and Development (DEVCO) in relation to the informal timber trade (completed with the submission of a *Society & Natural Resources* Special Issue published in 2015), bioenergy feedstocks (Pacheco et al. 2012), and Chinese investments in agriculture, forestry and mining in two geographic areas, viz. Central Africa, and the Miombo woodlands of southern Africa.

The three core thematic areas of research by Flagship Program 3 addressed the following overarching questions:

1. What are the public, private or hybrid institutional arrangements that have the most potential for enhancing the adoption of sustainability practices and social inclusivity in the value chain?

2. What conditions and support are needed to build business models involving smallholders and SMEs that are economically viable, socially inclusive and environmentally sustainable?

3. What mechanisms could promote more widespread adoption of responsible finance among financial service providers that not only improve sustainability but also stimulate the conditions that support smallholders' access to finance for forest and agroforestry-based systems?

Timber being transported on the road between the Nyon river and Yaoundé.

Photo by Ollivier Girard/CIFOR

2. Inclusive business models and finance

Annually, billions of dollars flow into rural landscapes worldwide. They are invested with widely diverse objectives, and can create the risk of negative interactions between the initiatives that are being financed and the effects of those initiatives. For example, governments may pay for conservation initiatives while at the same time subsidizing agriculture for the export market that puts pressure on the forests the governments want to conserve in the same landscapes. Often this occurs unintentionally. Identifying such interactions within landscapes allows opportunities for synergies between investments to be defined. In addition, many investments in the landscape are made to serve the goals of the investors, which may create frictions with the goals of the inhabitants of the landscapes or leave a number of important goals for these inhabitants unaddressed. In other cases, intentions may be good and commitments may meet international standards, but the business models are not able to achieve inclusiveness and sustainability. For inclusive agribusinesses to truly deliver on their transformative potential, a reimagination of business values, practices and ecosystems is needed.

FTA's research in this area proposes to inform businesses and service providers about business models that are more inclusive, gender-responsive, economically viable and environmentally sustainable and to support Ecological Social and Governance [criteria] integration in Financial Service Providers' products and services to increase the flows of investments in forest

and tree-crop sectors. FTA's attention to inclusive agricultural and forestry investment arose when researchers began to take note of rising investor interest in the southern hemisphere's farmland and forestland. In assessing the implications of this trend, FTA gradually shifted its focus to more sustainable and inclusive land-use alternatives. Recognizing that large-scale monocultural plantations in most contexts are rarely socially or environmentally sustainable, FTA began to critically examine whether production systems that effectively integrate small-scale producers could be more in keeping with sustainable food system objectives.

This culminated in a large body of work on contract farming, tenant farming and producer cooperatives, involving more than 200 case studies across ten commodities and eight tropical developing countries (Schoneveld et al. under review).[3] While partly validating past research that found that these models are generally welfare enhancing, the results of more recent research added much nuance to existing scholarly and development narratives on inclusive agribusiness (Schoneveld in press). For example, researchers observed that while improved access to production inputs and technical services helped close yield gaps and raise farmer incomes, at the same time it also facilitated large-scale extensification (Schoneveld et al. under review). Because improved access to technical services and inputs often enhanced income, smallholders — in the absence of alternative investment options and with more stable off-take markets — generally prioritized their budgets to reinvest the additional income in land accumulation (Schoneveld et al. under review). In many cases, this resulted in the conversion of natural ecosystems and/or land concentration and conflict. Moreover, the research also observed highly unequal distribution of costs and benefits. For example, family connections were instrumental in securing technical support from an inclusive business in one case and in obtaining cooperative membership in another (Schoneveld and Weng under review). Not only did few models include genuinely marginalized groups, a subsample of 12 case studies demonstrated that across the sample almost half of smallholder participants were unable to derive any meaningful gains from participation (Schoneveld et al. under review), meaning that no accumulation of livelihood assets (as a proxy for upwards mobility) occurred because of participation. This differed from case to case; smallholder capacity to accumulate was often affected by the type and quality of investor service offerings, most notably access to production inputs on credit. This study found that smallholders with fewer resources were least likely to benefit materially from participation. Many such smallholders fail to fully benefit from business service packages because of competing livelihood priorities (Schoneveld et al. under review), and are

[3] Specifically, the research focused on soy and sugarcane in Mozambique; oil palm, rubber and cocoa in Ghana; sugarcane, teak, rice, coffee and tea in Tanzania; sugarcane and tea in Kenya; oil palm and sugarcane in Uganda; oil palm, rubber and eucalyptus in Indonesia; oil palm and soy in Brazil; and cocoa and oil palm in Peru.

often unwilling and/or unable to reallocate household labour resources from subsistence to commercial cropping activities. This raises very real questions about the assumptions that underpin inclusion narratives and demonstrates that participation should by no means be considered an end in itself (as is generally done). FTA research based on enterprise-level and household-level interviews demonstrates the socioecological trade-offs and distributional inefficiencies of institutional innovations that aim to strengthen smallholder participation in agrifood chains (Schoneveld et al. under review).

Research that critically explored recent inclusive business policies and financial innovations revealed that intergovernmental bodies, development investor and donors pay little heed to the effects of their inclusive business promotion activities on social differentiation and environmental degradation (Schoneveld in press). Further, a recent policy shift can be observed that discriminates against small and medium enterprises in favour of large agribusinesses with scalability potential (ibid.). When pressured to scale their reach, inclusive agribusinesses find that their ability to deliver on their social missions, manage preference heterogeneity and calibrate their service offerings to the needs of their beneficiaries is often heavily compromised. This calls for a drastic shift in how inclusive agribusiness development is framed and how promotional activities are targeted and conditioned by

Palm oil production near Yangambi, DRC.

Photo by Axel Fassio/CIFOR

policymakers and development financiers.
FTA findings demonstrate that for inclusive agribusinesses to deliver on their transformative potential, a reimagination of inclusive business values, practices and ecosystems is needed. Schoneveld (2020, in press) and Schoneveld and Weng (under review) show how the concept of inclusivity can be operationalized in a different way for policy and financing purposes. Specifically, the research findings call for greater emphasis on managing trade-offs and on integrating food systems, agroecology and non-discrimination principles in working definitions of inclusive business. For example, funding support could be linked to monitoring of a project's environmental performance (specifically for issues such as agricultural runoff and smallholder land expansion) and to social welfare (in terms of integrating more smaller farmers with fewer resources into the supplier base). In addition, inclusive agribusiness policy needs to place more emphasis on developing and harmonizing technical support structures and on brokering cross-sector partnerships and capacity development services. This FTA research also found that investor willingness and capacity to develop more adaptive and inclusive business models is undermined by poor relations with, and the lack of capacity of potential governmental and civil society partners (Schoneveld 2020, in press and Schoneveld and Weng under review).

Parallel to the research on critical factors for successful transformation to adaptive and inclusive business models, FTA researchers looked at the role finance could play in supporting this transformation. Researchers reviewed the barriers to access for smallholder farmers and for small and medium agriforest businesses in general (Louman et al. 2020). Risk-adjusted rates of return, scale, and the nature of financial instruments were recognized as the main barriers to finance for smallholders, SMEs and communities. Although innovations have been implemented within the financial sector to increase the availability of finance for investments in sustainable land uses, in few cases do these innovations reduce risks while at the same time enhancing access to finance for the smallholders, SMEs and communities, and contributing to positive impacts.

FTA research analyzed the main financial flows in a cocoa landscape in Ghana (Pamerneckyte et al. 2020) and an oil palm landscape in Indonesia (Rossanda et al. 2020). Both cases used the integrated methodology for Landscape Assessment of Financial Flows (Shames et al. 2019; see Box 2). Although financial flows and their impacts differed between the landscapes, in both places private-sector investments contributed more to income generation than to objectives that support the sustainability and resilience of the landscape. Public (government) investments were more balanced

in their contributions to these objectives, but were insufficient to compensate for the negative effects of the investments by the private sector. In each landscape, participants identified private flows that had the potential for positive impacts on landscape objectives if the source of the flow were to implement environmental, social and governance (ESG) criteria in their investment decisions. Based on these findings, local NGOs started approaching selected private-sector stakeholders to discuss the importance of such criteria, as well as options to reduce the barriers to applying these criteria.

Yuliana carrying a bucket with oil palm fruits.

Photo by Icaro Cooke Vieira/ CIFOR

From ongoing in-depth case studies of financial flows that were deemed to be successful in combining economic viability with inclusiveness and good agricultural practices (Byakagaba et al. 2021; Impact Investment Exchange 2021; Lawrence and Louman 2021; Mawesti et al. 2021), FTA learned that implementing agencies (i.e. the source of financial flows) can reduce the risks of providing finance to farmers by linking it to access to technical assistance for improving agricultural practices and for administering the money. In addition, implementing agencies can facilitate farmers' compliance through more flexible collateral requirements and by adjusting payback periods to better align with local agricultural calendars. This confirms the importance of integrating access to finance into broader packages of support to smallholder farmers and SMEs. None of the implementing agencies studied are formal Financial Service Providers (FSPs), but most are connected to one or more FSPs with some ESG requirements. For these requirements to have an impact in the field, however, the intermediaries (who connect the providers and the recipients of funds) have to look for finance that allows them to provide the comprehensive package needed to reach out to the farmers, SMEs and communities that implement the sustainable practices (Byakagaba et al. 2021; IIX 2021; Lawrence and Louman 2021; Mawesti et al. 2021). Thus, based on these case studies, many international FSPs are adopting ESG criteria in their investment decisions (but still more need to do so), although collaboration with other actors (government, the private sector, civil-society organizations) will be essential to achieve the desired impacts on local people in the areas where these FSPs make their land-based investments.

Box 2. The integrated method for landscape assessment of financial flows

During the assessment local stakeholders gain greater insight into the financial sources in the landscape and what those sources invest in. And by analyzing the impacts of those investments on previously agreed-on landscape goals, they can identify financing gaps, as well as those flows that most need transformation. The assessment method has two phases. Phase 1 consists of an overview of the landscape economy based on existing reports. After preparatory work by a consultant, participants in a multistakeholder platform (MSP) workshop identify the principal sectors that contribute to the economy in terms of money, number of people involved or land area directly affected. During Phase 2, the MSP participants identify the main financial flows for each of these principal sectors, and discuss their perceptions of the impacts of these flows — both positive and negative — on landscape goals. This information is then validated through sectoral focal groups and interviews with key informants. Figure 1 shows the main results of such an analysis in an oil palm landscape in Indonesia.

Figure 1a. LANDSCAPE ANALYSIS OF FINANCIAL FLOWS, GUNUNG TARAK LANDSCAPE, INDONESIA

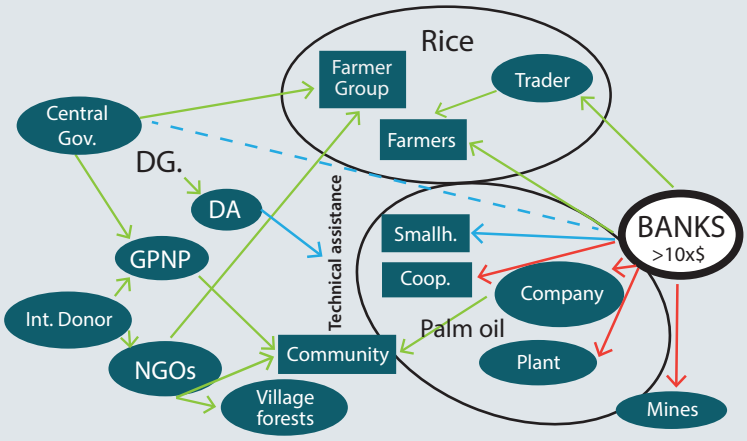


Figure 1b. PERCEIVED IMPACTS OF FLOWS FROM BANK AND GOVERNMENT SOURCES

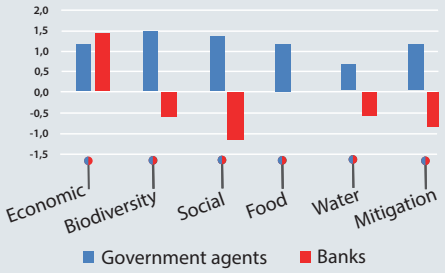


Figure 1a. Landscape analysis of financial flows, Gunung Tarak landscape, Indonesia
Legend: red lines = negative impact; green lines = positive impact; blue lines = neutral impact; DG = district government DA =s district agency[GPNP = Gunung Palung National Park
Figure 1b. Perceived impacts of flows from bank and government sources

Participants in the landscape assessments perceived the exercise as a good way to discuss land uses and their potential conflicts and synergies from a different — for them, innovative — perspective. Also, the assessments were inputs in subsequent landscape-level climate action plans, and some of the participants in the workshops showed interest in replicating the analysis for their own particular financial flows.

There is still a clear need for more solution-oriented research to stimulate wider uptake by smallholders. This should focus on improving understanding of what types of partnerships (encompassing state regulations and non-state sustainability initiatives) have been established, how they have been structured, which ones have been effective, and whether there is need to adapt them to different contexts. For example, it is still unclear how new public-private initiatives are engaging with nationally owned processes for reform. Such processes include debates around agrarian reform, the capturing of state revenue losses, licence review and social forestry (Luttrell et al. 2018). Aligning sustainability initiatives with these agendas is crucial to avoid undermining them. There is also a need to address performance gaps in the sector, with regard to social impacts, productivity and carbon emissions.

Bolaina workers at the sawmills, Pucallpa port Ucayali river.

Photo by Juan Carlos Huayllapuma/ CIFOR

Corporate actors are increasingly looking for place-based solutions such as jurisdictional approaches[4] and/or territorial sourcing using science-based targets. Many are trying to identify ways to resolve the tensions between the materiality of sourcing (i.e. what is being extracted from a particular landscape), and how much they need to put back in terms of improving livelihoods, access to clean drinking water and support for educational and primary health-care facilities. Such approaches are not new, but in the context of new reporting requirements aligned to the Sustainable Development Goals, they are increasingly perceived to reduce reputational risks. They will require building bottom-up processes that are able to define and achieve targets in specific locations with local producers.

Extensive engagement with national and provincial authorities in Indonesia was also undertaken in relation to planned investments associated with large-scale land acquisitions in Papua Province, Indonesia, and with SMEs in the furniture industry (Purnomo et al. 2014). New tools were provided to local government (e.g. a furniture enterprise map showing where furniture enterprises are located in Jepara, one of the largest furniture-making centres in Indonesia) and smallholders were supported to meet the new challenge of SVLK (timber legality) accreditation through collective action (see Purnomo et al. 2014). Furthermore, two background briefs were prepared for the Forests Asia Summit[5] in May 2014 that was opened by the Indonesian President.

Additional Phase II initiatives included: multistakeholder commodity-sector forums such as the day of dialogue on Inclusive value chains and sugarcane, rice and tea outgrower schemes in the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) initiative in Dar es Salaam in November 2017. Outcomes from these workshops initiated direct communications between smallholder outgrowers and the companies that contract them. Such communications improve contract negotiations, access to training and dispute resolution, and raise the profile of contract farmer livelihoods within the SAGCOT initiative.

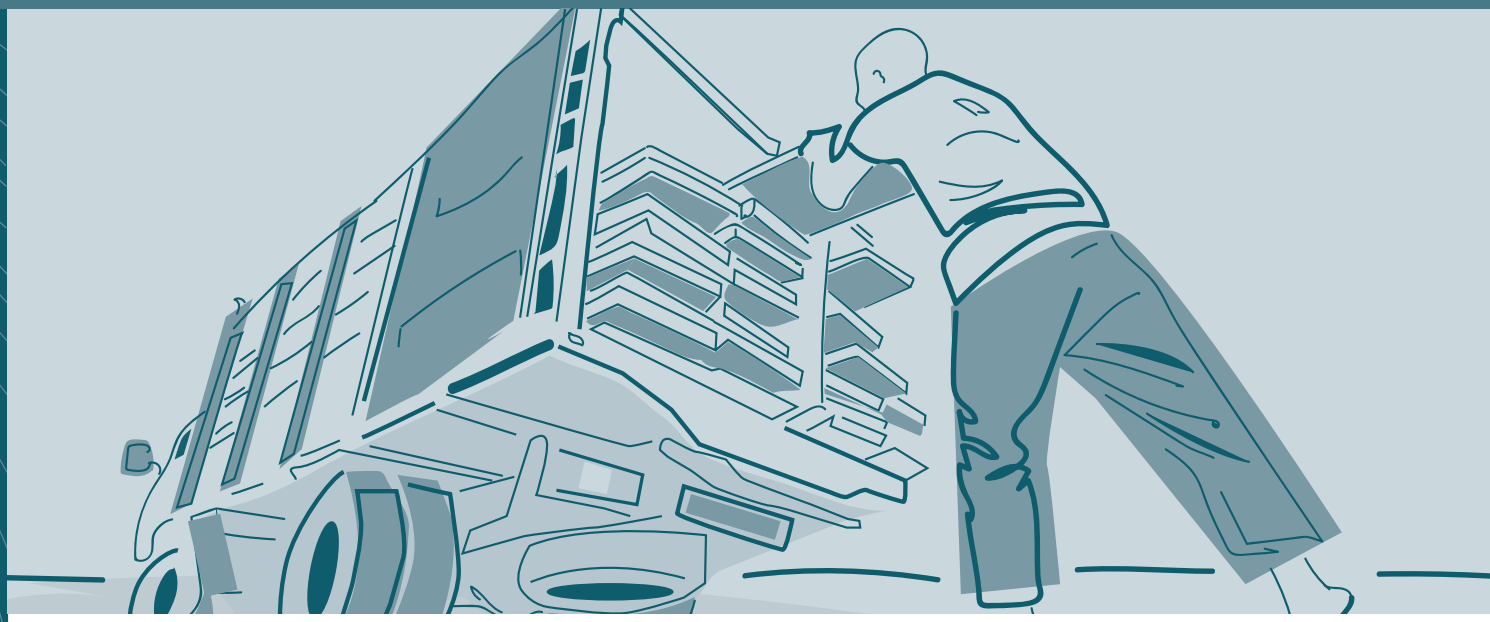
Academic conferences included the one hosted by the International Association for the Study of the Commons (IASC) in Utrecht in July 2017. It included two panels hosted by FTA: zero deforestation and policy regime complexity; and historical injustices, development failures and long-term dynamics of land and tree tenure. FTA also played an active role during conferences held by the International Union of Forest Research

[4] A type of landscape approach where the landscape boundaries are policy relevant (for example administrative boundaries such as province or district) and where the design is aiming at strong government involvement.
[5] Theme 1 of the summit was Governance and legal frameworks to promote sustainable landscapes. Theme 2 was Investing in landscapes for green returns. https://enb.iisd.org/events/forests-asia-summit-2014/summary-report-5-6-may-2014.

Organizations (IUFRO) and the World Forestry Congress during the period 2011 to 2021. These conferences led to the publication of several peer-reviewed articles and book chapters (for example, Schoneveld 2020 and Wardell 2020).

FTA and its partners — including the former Finance Alliance for Sustainable Trade (FAST), SNV and Profundo — have communicated research results on innovative finance through their ongoing engagement with Global Landscapes Forum (GLF) events.[6] A community of practitioners has committed to developing innovative financial instruments to fund restoration, and to strengthen the role of certification and accountability frameworks across supply chains.[7]

[6] These included the Investment Case event in London and the subsequent GLF in Marrakesh in June and November 2016 respectively; the Inclusive Landscape Finance Pavilion hosted by Tropenbos International in Bonn in 2017 and by EcoAgriculture Partners in 2018; the Investment Case event in Luxembourg in 2019; and most recently the GLF in November 2021: Investment Case symposium – Developing an Investment Case for Inclusive Food System Transformation https://conference.globallandscapesforum.org/climate-2021/session/75152b7f-cc24-ec11-981f-a085fcc5fc95.
[7] https://glfx.globallandscapesforum.org/topics/15264/feed.



3. Governing supply chains of forest-risk commodities

In the early 1990s, the failure to establish a binding international convention on forests, combined with growing evidence of the importance of forest ecosystems to the global environment, had a major influence on the governance of forest resources. At the same time, the first attempts were made to develop sustainability standards by public bodies such as the International Tropical Timber Organization (ITTO), and by NGOs such as the Forest Stewardship Council (FSC). In addition, several Western countries, notably those in the European Union, began to develop national and transnational public policies to compensate for the absence of an international convention. The Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan[8] was the result of this process in 2003.

The forestry sector and tropical commodities such as coffee, cocoa and bananas have been at the forefront of certification and of efforts to advocate for and implement sustainability initiatives (Pacheco et al. 2011; Lambin et al. 2014, 2018; Hospes 2014, Henders et al. 2015; Rueda et al. 2017; Mithofer et al. 2017; Komives et al. 2018; FAO 2018; Newton and Benzeev 2018; Oya et al. 2018; Stickler et al. 2018; Van der Ven and Cashore 2018; Taylor and Streck 2018; Pacheco et al. 2018a; Moser and Leopold 2019; Sanial et al. 2019; Ingram et al. 2020; Ehrenberg-Azcarate and Pena-Claus 2020; Escobar et al. 2020; MSI 2020). Other commodities did not address these issues until about ten years later, as shown by the creation of the Roundtable for

[8] https://www.euflegt.efi.int/home.

Sustainable Palm Oil (RSPO) label in 2004. Today, there is still an absence of criteria for the sustainable production of natural rubber and beef. FTA research has included the informal timber trade and domestic markets (Box 3).

Box 3. Domestic timber markets

FTA research[9] to promote the integration of smallholders, chainsaw millers and traders who depend on domestic timber markets influenced the European Commission's FLEGT policy framework, and after 2013 the negotiation of Voluntary Partnership Agreements (VPAs) between the EU and timber-producing countries. FTA research findings were acknowledged in discussion forums organized by the European Commission (DEVCO), Chatham House, Food and Agriculture Organization (FAO), the European Forestry Institute and other global forestry organizations.[10]

FTA research has also influenced public policy in several producer countries. In Cameroon, for example, the government has recently imposed a requirement for legal timber to be used in all public procurement.[11]

In Indonesia, FTA conducted work to support forest reforms related to the implementation of the country's VPA. FTA research also supported small-scale furniture enterprises and their suppliers in central Java through the establishment of the Jepara Small-scale Furniture Producers Association. This allowed members to negotiate with the Indonesian Furniture Industry & Handicraft Association, and with the Jepara Wood Traders Association. About 85% of the producer association members have seen an improvement in total production, sales and profits in the last few years.[12]

[9] Most FTA publications on this topic can be found in our projects' websites: http://www1.cifor.org/pro-formal/home.html, https://www.cifor.org/fr/profeaac/, https://www.cifor.org/essor/, https://www2.cifor.org/furniture/_ref/home/index.html, https://www.cifor.org/knowledge/project/PMO-0951, https://www2.cifor.org/ilea/_ref/home/index.html.
[10] https://ec.europa.eu/environment/forests/pdf/conf_21_06_2017/TDIL_FINAL_REPORT_DEF_PART.pdf.
[11] http://www.fao.org/in-action/eu-fao-flegt-programme/news-events/news-details/en/c/1372900.
[12] https://www.asocam.org/sites/default/files/publicaciones/files/29858a0cb535f994be2bbbc0d13a707f.pdf.

Over the past twenty years, the governance of tropical forestry and agricultural sectors has grown in complexity. Private-sector and civil-society organizations have been increasingly involved in building alliances, platforms and multistakeholder process to improve the regulations for timber and commodity crops that place pressures on forest landscapes, and to tackle their social and environmental impacts. A growing number of governance policies and mechanisms have been adopted by individuals or groups of consumer countries, transnational corporations, or platforms involving international and national NGOs. This has also contributed to fragmenting governance systems, given the strong emphasis of these policies on specific sectors and forest-risk commodities. FTA has examined some of these new governance mechanisms, focusing on the timber, palm oil and beef sectors, to identify emergent approaches, evaluate theories of change and impact pathways, and contribute to evolving policy recommendations and strategies for private-sector engagement (Wardell 2020).

The sustainable forest management paradigm was a major driver of change in forest governance, which motivated the launch of the FLEGT Action Plan and subsequent negotiations with producer countries to define its content. Given the difficulty of agreeing on a definition of sustainability, the EU and its partners have retained legality as the primary objective of their collaboration. A major effort was made by the EU to support the definition and clarification of legality criteria for timber production and trade in producer countries. FTA contributed to this effort in several countries, including Cameroon and the Central Africa Republic (CAR); see Brown et al. 2008; Tacconi 2007; Cerutti and Lescuyer 2011; and Lescuyer et al. 2014. However, in the context of implementing the VPAs, FTA's main focus was characterizing national timber markets and supporting informal smallholders, mainly in Central Africa and Indonesia. Although the domestic sector is mentioned in the VPAs, it emerged as a blind spot in their implementation and in national public policies. Numerous publications produced by FTA[13] showed the importance of domestic consumption and regional wood flows, and contributed to putting the domestic sector on the political agenda of many producer countries and the European Commission.

These outcomes are the result of numerous, constructive and long-term interactions with FTA's partners. This is illustrated by the evolution of cooperation between FTA and the Ministry of Forests (MINFOF) of Cameroon on legal timber over the past ten years:

[13] http://www1.cifor.org/pro-formal/publications.html.

- between 2007 and 2009, MINFOF was mainly informed of FTA research results;
- between 2009 and 2012, MINFOF was formally consulted on the inputs/outputs of FTA research projects;
- from 2013 until 2021 MINFOF was a formal partner of FTA projects, with co-production of knowledge, shared management of activities, joint budgets and bank accounts, and co-responsibility for delivering results.

This long-term collaboration has allowed for a concerted effort to produce impacts such as the decree adopted in December 2020 that imposes a requirement for legal timber in all public procurement.[14]

A wood seller at Montée Parc Market, Yaoundé, Cameroon.

Photo by Ollivier Girard/CIFOR

[14] https://www.atibt.org/fr/news/12917/marche-publics-au-cameroun-obligation-d-utiliser-du-bois-legal , or https://forestsnews.cifor.org/70746/cameroun-un-nouveau-jalon-pour-la-promotion-du-bois-legal-dans-le-marche-domestique?fnl=fr.

In parallel to the work on FLEGT and the formalization of small-scale timber harvesters, the implementation of the Forest Stewardship Council (FSC) standard was the subject of several studies by FTA, especially in Central Africa. Three angles of research were addressed:

1. The impact of FSC was the subject of numerous methodological studies (Romero et al. 2013, 2017) on the perceptions of stakeholders (Cerutti et al. 2020), and in terms of local governance (Tsanga et al. 2014), environmental sustainability (Cerutti et al. 2011) and social aspects (Cerutti et al. 2014b, 2017).
2. An analysis of FSC audits in three tropical river basins brought to light some local and systemic limitations of this private-sector certification approach (Piketty and Drigo 2018; Piketty et al. 2019).
3. The interactions between private forest management and public policy were reviewed and detailed for several Central African countries (Tsanga 2021; Lescuyer et al. 2021) and contributed to convincing the governments of Gabon and Cameroon to fully or partly endorse the FSC standard in order to support sustainable forest management and timber traceability. FTA insights on and recommendations for forest certification were also used by the stakeholders who revised the national FSC norms in Cameroon, Congo and Gabon that were published in 2020 and 2021.

Since the late 1990s, forest governance has not only been associated with forest management and timber legality, but has also rapidly encompassed the issue of agricultural crops that lead to growing deforestation, particularly in tropical landscapes: the so-called forest-risk commodities. Examples of these commodities include palm oil in Southeast Asia and beef from cattle ranching in the Amazon.

In Indonesia, public authorities, driven by economic development goals, have adopted policies favouring the expansion of oil palm plantations. Several production models have been studied by FTA, including their uptake of environmental concerns and their impacts on small producers. The implementation of RSPO, the international sustainability standard for palm oil, has given rise to much discussion on both its content and its implementation. Discussions have also included the politics of approaches to stimulate sustainable production and trade, particularly those linked to EU policies. Malaysia and Indonesia developed their own mandatory national standards for palm oil (MSPO and ISPO, respectively) within relatively complex frameworks that regulate land allocation, production systems, incentives and business models.

Cable system to transport oil palm harvest in San Martin, Peru.

Photo by Juan Carlos Huayllapuma/CIFOR

Growing concerns about sustainability in the forest and palm oil sectors were related to the uptake of and reporting on specific practices, measuring target achievements for social and environmental indicators, establishing traceability, screening suppliers, and adjusting to finance screening guidelines. These have progressively added complexity to the governance of supply chains. Pacheco et al. (2018b) show that such complexity is the case in the palm oil sector. This has led to the development of multiple approaches to implement sustainability initiatives that also relate to how supply chains are structured (Rajeev et al. 2017; Agrawal et al. 2018; German et al. 2020). Pacheco et al. (2018b) group them into three categories: 1) individual company- or group-focused approaches based on the adoption of voluntary sustainability standards; 2) sectoral approaches with a focus on supply-chain-based interventions; and 3) combined supply chain and territorial approaches at the jurisdictional level. Each approach has its potentials and limits, and can lead to different associated risks and benefits for the stakeholders, depending on their influence in the specific landscape or supply chain (Wardell et al. 2021).

There is much controversy regarding palm oil development in Indonesia, which is mainly linked to its contradictory impacts (van Noordwijk et al. 2017). The sector is a significant driver of economic growth and is important to the development of Indonesia's economy at both the national and sub-national levels. However, it is also a major driver of biodiversity loss and deforestation in the country, which leads to an important carbon debt, particularly when oil palm expands into peatlands (Pacheco et al. 2017a).

For more information about work on REDD+ combating climate change with forest science conducted within FTA please see Highlight No. 11 in this series (Martius and Duchelle 2021).

The industry has been under increased scrutiny, with oil palm expansion attributed to increased instances of fires, deforestation and peat exploitation, and to a consequential reduction in biodiversity. Various policy initiatives and multistakeholder processes have responded in an effort to improve standards for sustainable production. Extensive FTA research undertaken since 2010 has contributed to improved policies and practices that support environmentally conscious and socially inclusive oil palm. FTA's gender research included assessing the socioenvironmental footprint of palm oil enterprises in Ghana (Box 4).

Box 4. Socioenvironmental footprint of palm oil enterprises, Ghana

FTA supported efforts to connect smallholder oil palm research in the Eastern Region of Ghana to a dynamic and diversifying landscape of palm oil processors and traders who are reshaping value chain opportunities. Ghana is a major producer and consumer of palm oil, yet is unable to meet its domestic demand. Most palm oil is produced by artisanal mills, which are still dominated by small-scale women processors; the formal sector is organized around four major processing companies (MoFA 2010). Competition for fresh fruit bunches (FFBs) in the Eastern Region is especially intense as new processors emerge to innovate on service delivery and new payment schemes are established to capture farmers' business. Under the project "Sustaining palm oil: Social footprinting of informal and formal market value chains" (Ihalainen et al. 2021), FTA gender specialists are mapping the functional niche that these traditional and emerging business models serve in the oil palm economy in terms of economic participation, environmental and occupational health, and women's and men's empowerment. The results have been translated into visual media for decision-making and planning within a jurisdictional-level Oil Palm Working Group led by the Oil Palm Research Institute of Ghana (CSIR-OPRI) which is negotiating an Oil Palm Development Strategy with Municipal and District Assemblies, companies and artisanal processors, smallholder representatives and the Tree Crops Development Authority; the strategy is due by 2022.

Aerial view of palm oil plantation and the forest in Sentabai Village, West Kalimantan, Indonesia

Photo by Nanang Sujana/CIFOR

A recent independent evaluation of FTA's palm oil research in Indonesia, based on a portfolio theory of change (Davel et al. 2020) showed that this research had contributed to the partial or full realization of 18 of 21 outcomes (ibid., x; also see Box 5). Targeted policy changes have occurred at the provincial level (e.g. provincial regulation in East Kalimantan) and the international level (e.g. addressing gender issues within RSPO). Overall, the most influential mechanisms leveraged by FTA's research portfolio related to the production of new, neutral and credible knowledge, and the reputations of CIFOR and FTA and its partners. The evaluation showed a need, however, for more planned coordination, cohesion and coherence across research efforts on palm oil issues in Indonesia (Davel et al. 2020, xiii). A summary of the key lessons learned from the evaluation is presented in Box 5.

Box 5. FTA Evaluation of the oil palm portfolio: Lessons learned

Lesson 1: Engagement and collaboration contribute to outcome realization. When possible, projects should be designed to engage target audiences, participants and partners appropriately in project design, or early on in project implementation, to facilitate a spirit of collaboration and partnership, and ensure mutual benefits.

Lesson 2: Multiple channels of communication that are tailored to the intended audiences for relevance and are accessible to them help realize policy outcomes. Research communications should be timely and responsive to other system processes, and are more effective at sharing knowledge when outputs are tailored to and appropriate for the needs of each target audience.

Lesson 3: Capacity building supports research uptake across pathways. Opportunities for capacity building for research participants, partners and target audiences should be considered and integrated into project design and implementation.

Lesson 4: Research planning should deliberately focus on solution development and implementation support. Projects should prioritize opportunities to address knowledge gaps or problems deemed important by stakeholders. Boundary partners[15] should be identified based on their ability to use research outputs and to support solution development, testing and/or implementation.

Lesson 5: Projects/programs do not use theory of change consistently, and connections between projects are not always coherent. Researchers and program managers should fully utilize theory of change as a core element of project planning and adaptive management.

Lesson 6: Clarity in research focus and connection to a relevant social problem are paramount. The research focus and its connection to a relevant problem should be clear.

Lesson 7: There is scope for improved coordination and synergy across related projects to increase the potential for impact. When possible, research efforts should be coordinated and integrated by overlapping issues, target audiences, geographies, and intended outcomes

[15] Boundary partners are stakeholders who are influenced by a project and who contribute to its impact.

Box 5. FTA Evaluation of the oil palm portfolio: Lessons learned *cont...*

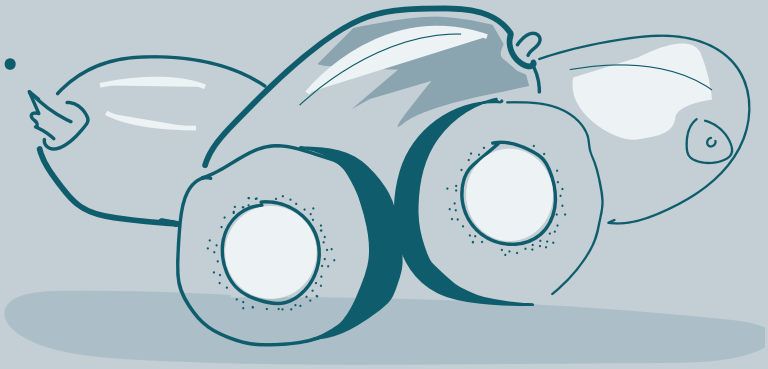
to maximize their possible influence. Existing relationships should be considered and sustained to support the effective implementation of new projects.

Lesson 8: Reliance on individual champions (as opposed to institutional relationships/partnerships) leaves research uptake susceptible to turnover. Organizations should consider developing institutional relationships and partnerships that support institutional capacity and fill knowledge gaps in order to realize intended outcomes.

Lesson 9: The lack of official endorsement hinders research uptake by governmental actors/agencies. When the government is intended to benefit from or use the research, it is important that researchers establish formal partnerships and foster processes with government to co-generate data, to increase the likelihood of the research being used.

Lesson 10: More research is needed on relevant topics to support solutions that help realize sustainability and equity in Indonesia's palm oil sector. Respondents identified and suggested areas for future research efforts, such as providing needs-based solutions that allow companies and independent smallholders to adopt sustainable practices; the impact of peatland restoration on oil palm emissions and smallholders; the costs, benefits and impacts of certification systems and other policies and how to implement them; and entry points to support smallholder formalization. These topics should be considered when designing new research projects on the topic of oil palm.

Based on: Davel et al. 2020, xiii–xiv



Throughout FTA Phase II, research findings were communicated during multiple events. These included private-sector initiatives such as the Innovation Forum event, "How business can make smallholder supply chains resilient," in London in March 2018. FTA was represented on a panel with trade conglomerate Sime Darby Berhad and presented a portfolio of Info Briefs based on palm oil research results from Indonesia. FTA subsequently joined the first Sustainable Landscapes conference, hosted by Innovation Forum in London in November 2018.

FTA also contributed to multistakeholder Platforms such as the Roundtable on Sustainable Palm Oil, the Global Shea Alliance and, most recently, the Global Platform on Sustainable Natural Rubber (GPSNR) established in 2018. Additional details can be found in the FTA review of Multi-Stakeholder Platforms (Wardell and Cheyns in press).

During the period 2011–2021, the emphasis of FTA research shifted to embracing different types of suppliers — from small- to large-scale loggers and farmers — and to linking global trade and investments to state- and market-driven responses to address their socioenvironmental impacts from the sub-national to the global level. FTA research has focused in particular on three commodities: palm oil, timber and beef. Each has specific geographies: Indonesia, the Congo Basin and the Amazon biome, respectively. Additional research on the global trade in shea nuts and shea butter to meet the growing demand for cocoa butter equivalents in the specialty fats market included a new partnership with the Global Shea Alliance (Box 6). More recently, FTA also initiated research on the sustainability of natural rubber through a new partnership with the International Rubber Study Group and the GPSNR (Gitz et al. 2020).

There are still gaps in FTA knowledge in terms of the role and functioning of multistakeholder partnerships (MSPs) associated with forest-risk commodities.

Shea butter production process near Chiana, Kassena Nankana District - Ghana.

Photo by Axel Fassio/CIFOR

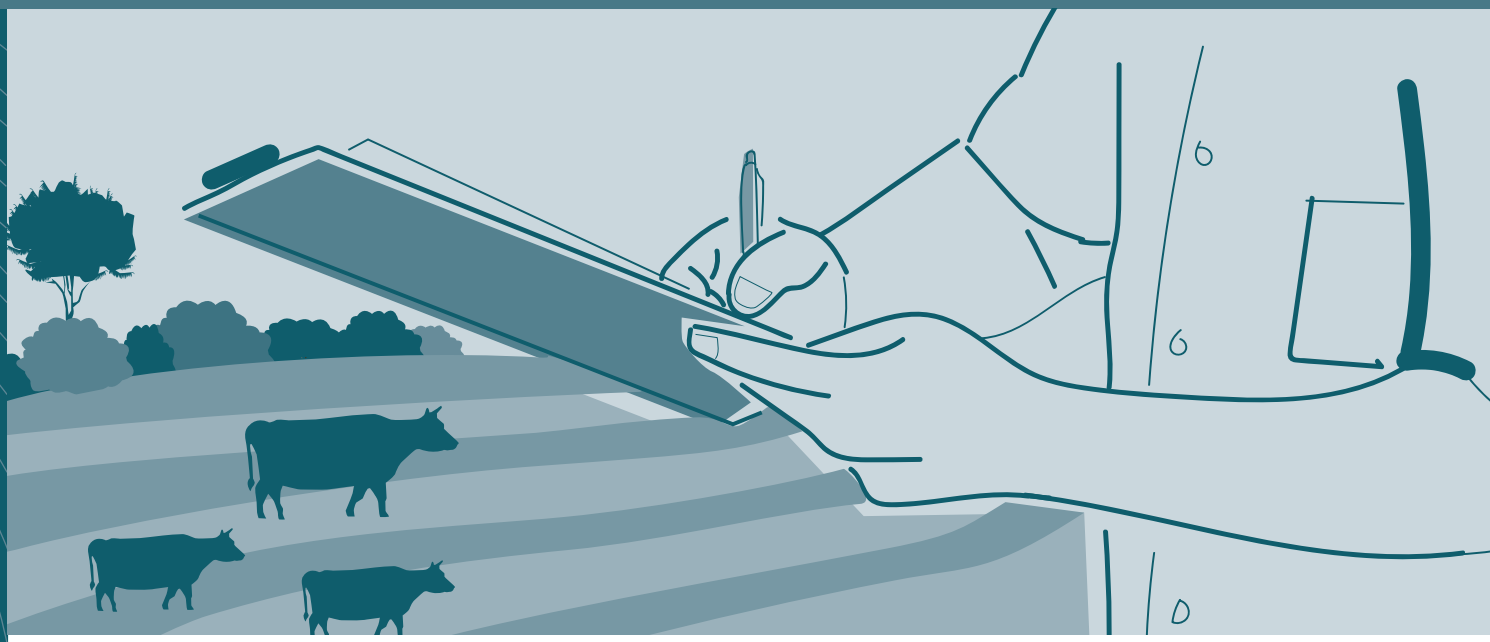
Box 6. Shea – a gendered value chain and the Global Shea Alliance

Shea fruits, shea nuts and shea butter are non-timber forest products from the shea tree (*Vitellaria paradoxa*), the most frequently occurring tree species in the agroforestry parklands of West Africa. FTA's research on shea value chains was initiated in West Africa in 2013 (Wardell and Fold 2013; Rousseau et al. 2015). FTA research findings have been presented at conferences of the Global Shea Alliance (GSA) and at virtual events during the period 2018 to 2021. Findings included novel research methods to assess the security of shea tree tenure (Rousseau et al. 2016a), processes of social differentiation (Rousseau et al. 2016b), and opportunities for and risks of globalized trade for women shea producers (Mollins 2020).

These partnerships provide a mechanism to build coalitions of interest groups through "the balanced representation and participation of all categories of stakeholders" (Cheyns 2011, 1). MSPs have subsequently been conceived of as pathways of influence (Cashore and Lupberger 2015), and as promoting stakeholder learning dialogues (Cashore et al. 2019). Furthermore, MSPs are identified in Target 17.15 of Sustainable Development Goal (SDG) 17 as a central tool in the implementation of the SDG 2030 Agenda.[16] Many different types of MSPs have been established in various parts of the world, involving different themes and commodities, and at varying levels of governance. In 2018, the High Level Panel of Experts on Food Security and Nutrition conducted a review of MSPs in order to finance and improve food security and nutrition in the framework of the 2030 Agenda (HLPE 2018). Other reviews have focused on health-related MSPs (Hemmati 2002); the exercise of power through MSPs for sustainable agriculture (Cheyns and Riisgaard 2014); MSPs to support small and medium-scale forestry enterprises in Indonesia (Purnomo et al. 2014); MSPs in integrated landscape initiatives (Kusters et al. 2018); and subnational MSPs (Sarmiento Barletti et al. 2020).

To build on lessons learned through these earlier exercises, an FTA review of multistakeholder initiatives, predominantly associated with forest-risk commodities and established during the period 1990 to 2018, was commissioned in 2021 (Wardell and Cheyns 2021). This review aim to summarize some of the outstanding challenges faced by many MSPs, notably ensuring greater smallholder inclusiveness, oversight and the role of auditors, funding/sponsorship of MSPs, knowledge systems, and access to information.

[16] https://sdgs.un.org/topics/multi-stakeholder-partnerships-and-voluntary-commitments.



4. Public and private commitments to zero deforestation

The New York Declaration on Forests in 2014 (NYDF 2021) and the Amsterdam Declaration Partnership in 2015 (Amsterdam Declaration 2015), initiated ambitious individual and group commitments and pledges from key corporations and some governments, including those at the subnational level, to tackle persisting deforestation. FTA has analyzed some of the institutional challenges emerging from these commitments, and the scope and potential of public and private arrangements to implement them, as well as the associated obstacles (Piketty et al. 2015; Piketty et al. 2017a; Pacheco et al 2017c; Pacheco et al. 2018a; Jopke and Schoneveld 2018; Brandao et al. 2020). FTA's main emphasis was on the institutional arrangements needed at the subnational or landscape level, involving a diverse range of stakeholders, to halt deforestation by combining supply chain and territorial approaches with a focus on beef, soybean and palm oil.

In Brazil, starting in 2006, some innovative institutional arrangements between the public and private sector induced major shifts in the governance of the soybean and beef cattle value chains, the main drivers of land-use change in the Amazon. A moratorium was signed by the major soy buyers, forbidding them to trade soybean planted in areas deforested in the Amazon biome after 24 July 2006 (the cutoff date was later postponed to 2009).

Regarding the beef cattle value chain, a Conduct Adjustment Agreement/ Termo de Ajustamento de Conduta (TAC) was signed between the main meatpackers, NGOs and the government. The main meatpackers committed to not using any suppliers who were involved in illegal deforestation after 2009 (Nepstad et al. 2014; Gibbs et al. 2015a; Tonneau et al. 2017).[17]

These cases show that in spite of progress made in reducing deforestation, the systems for verifying compliance with environmental regulations do not address sustainability issues sufficiently broadly, nor do they address all legality issues (Piketty et al. 2017b). Neither soybean producers nor cattle ranchers are obliged by these arrangements to restore their forest reserve, an obligation of the forest code, if they fully cleared it before the cut off date of the Soy Moratorium or of the TAC (Piketty et al. 2017b). This results in unfair procedures that offer equal access to farmers who fully cleared their property before 2008 and those who fully respected the Forest Code (Tonneau et al. 2017). The situation of the suppliers is also problematic in the case of the beef cattle value chain: indirect suppliers of calves are mostly medium and small farmers who are spread over a huge territory that is very costly to monitor. Some of them, particularly smallholders, are settlers living in remote areas where deforestation still occurs (Godar et al. 2014; Piketty et al. 2015). The TAC led to only some components of public regulations being enforced, mostly the control of illegal deforestation by direct suppliers. However, the TAC does not guarantee that illegal deforestation is completely banned from the beef meat supply chain or that soybean suppliers are fully respecting the Forest Code.

Cattle farming is a key driver of deforestation in Brazil. Rio Branco, Acre, Brazil

Photo by Kate Evans/CIFOR

[17] Direct suppliers are cattle ranchers selling their animals, adult and fattened, directly to the meatpeackers. Indirect suppliers are producers selling their calves, two or three years younger, to such cattle ranchers. The TAC implies that all direct and indirect suppliers will be monitored but in practice only direct suppliers are monitored.

FTA research has added two critical elements to these debates. The first is that commitments to zero deforestation should not be considered in isolation from the wider processes of forest degradation that are also unfolding in forest landscapes. This has been shown in the Brazilian Amazon (Blanc et al. 2017; Bourgoin et al. 2018) and confirmed recently by a global worldwide assessment (Vancutsem et al. 2021). Zero-deforestation commitments alone, while effective for halting forest conversion, may also lead to forest mosaics difficult to effectively maintain and with low potential to conserve ecosystem services; commitments may be even more compromised if their implementation depends only on individual farmers' decisions. Wider collaborations, such as those to enhance connectivity in landscapes, may be needed to guarantee the restoration of ecological functions in threatened landscapes.

The second element is that land-use intensification in a zero-deforestation context is not spatially uniform, since farmers aim to optimize the use of natural resources by intensifying land use in areas with high agricultural potential and leaving others areas for forest conservation or regeneration (Plassin et al. 2017; Poccard-Chapuis et al. 2021). This calls for a better

Cattle farming in Brazil.

Photo by Icaro Cooke Vieira/ CIFOR

understanding of the original land conditions, and of the interactions between zero deforestation and forest conservation, restoration, forest degradation and land intensification. FTA has shown, by studying the Paragominas municipality in the eastern Brazilian Amazon (Poccard-Chapuis et al. 2021), that it is technically possible to map these dynamics and optimize future land-use scenarios while halting deforestation and reversing forest degradation. These efforts are linked to governance mechanisms operating at the subnational level. Working at this governance level is essential to build the rules and individual farm protocols for landscape design and for monitoring land-use changes.

Furthermore, zero deforestation target, whether net or gross,[18] cannot be dissociated from wider goals for supporting sustainable agrarian and forestry transitions in forest landscapes. Preserving and restoring the ecosystem services provided by forests in conservation lands is as important as restoring soil fertility in agricultural lands for sustaining agriculture and livestock to effectively guarantee long term zero-deforestation commitments (Piketty et al. 2017a; Tonneau et al. 2017). FTA research found that private initiatives implemented at the supply chain level alone are insufficient to guarantee such objectives and require different types of public and private arrangements that involve supply chain and territorial goals (Pacheco et al. 2017d).

Additional work was conducted by FTA to explore the political economy of zero-deforestation commitments in specific jurisdictions in Kalimantan, Indonesia, where jurisdictional approaches were emerging as well as perspectives for public-private arrangements (Luttrell et al. 2018). The major supply chain actors, at the meeting of the Tropical Forest Alliance 2020, held in 2019,[19] defended the need to embrace jurisdictional initiatives with more ambitious goals than just zero deforestation.

Given the importance of better understanding the feasibility and potential of jurisdictional approaches to tackle deforestation and enhance the provision of ecosystem goods and services, FTA has undertaken research in selected jurisdictions of Brazil, Colombia, Ghana, Peru and Indonesia (Piketty et al. 2018; Poccard-Chapuis 2020; Van der Haar 2019; Nieto Mendez et al. in press). Empirical knowledge about how jurisdictional approaches work in practice and under what conditions they are effective remains scarce, however (Chervier et al. 2020). FTA's work provided evidence of the progress achieved in some jurisdictions in their efforts to reduce deforestation, but also found that there is often no local uptake of zero-deforestation targets alone

[18] Gross deforestation refers to clearing of native forests; net deforestation refers to a reduction of total forest area, including potential compensation by reforestation and afforestation.
[19] https://www.tropicalforestalliance.org/assets/Uploads/TFA-Annual-Meeting-2019-report.pdf.

by jurisdictions. In addition, each jurisdiction is unique in its biophysical, social, economic and institutional features (e.g. spatial configuration, agrarian structure, land-use activities and deforestation drivers), and is also shaped by external factors (e.g. market trends, value chain configurations, and interventions that interact in distinct ways in each jurisdiction). This means that jurisdictional approaches may offer the opportunity to tailor solutions to specific contexts (Box 7). It also means, though, that different jurisdictions may not be equally ready to adopt measures to halt deforestation, and reach either net, gross, legal or illegal zero-deforestation targets (Brandao et al. 2020). Therefore, monitoring of implementation is essential, both to demonstrate progress and point out weaknesses and to continue to build learning and stakeholder engagement, acknowledging any potential and actual obstacles.

Box 7. Engagement with infra-national jurisdictions to tackle deforestation in the Amazon

In the Amazon, the TerrAmaz project was officially launched on 10 September 2020. The project supports Amazonian jurisdictions, starting with five pilot territories in Brazil, Colombia, Ecuador and Peru, in the fight against deforestation and the transition to sustainable development. The project will receive EUR 9.5 million in financial support from Agence française de développement/French Development Agency (AFD) over four years.[20] TerrAmaz fits with France's commitment to the International Alliance for the Preservation of Forests and the national strategy against imported deforestation (La Stratégie Nationale de lutte contre la Déforestation Importée/SNDI).[21] Two of its pilot sites are FTA case studies: Guaviare department in Colombia and Paragominas municipality in Brazil. There, the commitment of local actors, including local governments, has been confirmed by the signing of agreements to jointly implement the project.[22] Importantly — and despite the resumption of deforestation in the Brazilian Amazon in recent years — Paragominas has confirmed its commitment to control deforestation in its territory, and still records a low rate of deforestation. The TerrAmaz project also works in Madre de Dios, Peru, and builds from knowledge produced by FTA in San Martín Province, Peru.

[20] The project is coordinated by CIRAD, in partnership with ONF-International and AVSF.
[21] https://www.cirad.fr/espace-presse/communiques-de-presse/2020/amazonie-transition-agriculture-durable-lutte-deforestation.
[22] https://bresil.cirad.fr/pt/atualidades/projeto-terramaz-assinatura-do-contrato-de-cooperacao-2020-2024; and https://co.ambafrance.org/TerrAmaz-Amazonia.

Aerial view of the Amazon rainforest, near Manaus the capital of the Brazilian state of Amazonas. Brazil.

Photo by Neil Palmer/CIAT

FTA research also contributed to improved understanding of the implications of zero-deforestation commitments by large companies in Indonesia in the form of various pledges around No Deforestation, No Peat, and No Exploitation (NDPE), and to identify what was missing for their effective implementation (Luttrell et al. 2018). These commitments were a response to global demands from non-governmental organizations to clean up supply chains and raise standards. At the same time, at the national and subnational level, new governance arrangements emerged in many countries for sustainability initiatives involving government, the private sector and other non-state actors. There is still a need for more basic knowledge, such as how much deforestation can be attributed to forest-risk commodities, how much of it is due to smallholders, the effect of supply chain initiatives on reducing deforestation and improving smallholders' income, and how benefits flow along the supply chains. Research is also required to assess the outcomes of the new partnerships emerging around finance, extension services and supply chain governance.

As with the governance of palm oil, the evolution of governance arrangements to manage tropical forests has become increasingly complex (Zeitlin and Overdevest 2020). Earlier research on certification systems indicated that although benefits from price premiums and market access were limited, less tangible benefits were more common, including learning, improved governance, community empowerment, and reputational gains.

Wood processing at the Compagnie Forestiere et de Transformation (CFT) in Kisangani, DRC.

Photo by Axel Fassio/CIFOR

These benefits may justify the cost of certification (Cerruti et al. 2014b; Carlson and Palmer 2016). The FLEGT theory of change is based on three types of actions: timber production, timber demand, and global timber trade standards and dynamics. Through its Voluntary Partnership Agreements (VPAs), FLEGT works in more than a dozen countries. An independent evaluation of the EUR 900 million invested in the FLEGT Action Plan during 2003–14 concluded in 2016 that it was a relevant and innovative response to the challenge of illegal logging and that it had improved forest governance in all target countries, but that it needed to address new challenges, in particular deforestation and forest conversion (EC, 2016). Extensive FTA research conducted since 2010 has contributed to improved policies and practices promoting sustainable timber production in several countries (for example, the decree adopted in Cameroon in 2020 to impose legal timber in public procurement, and proposed improvements in FSC's certification system). Research on the significance of domestic timber markets led the EC to include domestic timber in the negotiation of some VPAs (Cerruti et al. 2014a; see also Cerruti et al. 2020) and caused some countries such as CAR to put timber domestic markets out of the scope of their VPAs (Lescuyer et al. 2014). In addition, research has led to improvements in the implementation of the FSC standard (Cerruti et al. 2017; Piketty and

Drigo 2018; Piketty et al. 2019), and has improved understanding of zero-deforestation commitments (Pirard et al 2015a, 2015b; see also Pirard et al. 2019). Most recently, research in Cameroon, Ghana and Indonesia developed a perception-based methodology, linked to the FLEGT global theory of change, to assess the impacts of VPAs on policy (Cerruti et al. 2021). Again, the most influential mechanisms leveraged by the portfolio of FTA research on sustainable timber production are the production of new, neutral and credible knowledge, and the reputation of its key partners, such as the Center for International Forestry Research (CIFOR) and the Agricultural Research Centre for International Development (CIRAD).

Different types and scales of forest industries have had different experiences with timber legality licensing. Small and medium enterprises (SMEs) continue to experience significant technical and financial difficulties related to the licensing process. Additional research is needed to address the key issues and challenges that SMEs face, and to identify support mechanisms that will help them deal with adverse impacts (Maryudi et al. 2021). To this end, FTA continues to support an FSC initiative to develop and test the New Approaches project to promote greater smallholder engagement by developing and testing a simplified regional FSC standard in Indonesia, Thailand, Vietnam and India (Brady 2019).

Supporting transitions to more sustainable beef production in the Amazon also constituted an important part of FTA's research portfolio. Research built on a well-developed understanding of the conditions that drive cattle ranch expansion in the Amazon, and of the diversity of production systems and their environmental and social impacts in the Amazon (Pacheco and Poccard-Chapuis 2012; Nepstad et al. 2014). FTA research contributed to understanding the potential land limits of the cattle agreements i.e. the TAC and former private agreements between Greenpeace and meatpackers (Piketty et al. 2017b). It also supported efforts to build the necessary evidence to advance improved technical models in order to promote sustainable cattle intensification that is adapted to a range of farmer means and needs. Indeed, many current models aim only to maximize land productivity and have relatively high costs of labour, equipment and inputs, which are very demanding of knowledge and labour quality and not possible for many farmers. Research has argued that achieving sustainable beef production in the Brazilian Amazon's agricultural frontiers requires not only public–private institutional arrangements to enforce compliance with environmental laws, but also incentives and reward systems that facilitate the uptake of silvicultural systems that use natural resources more efficiently (Pacheco et al. 2017c; Plassin et al. 2017). Researchers engaged regional financial institutions

to assist in the design of tailored loans that acknowledge production systems with higher environmental standards.

During Phase II, FTA broadened its communications through government-driven policy dialogues, such as a keynote presentation at an event in Brussels in June 2017 with DEVCO on tackling deforestation and illegal logging (Pacheco 2017d). The FTA Science Conference 2020, "Forests, trees and agroforestry science for transformational change," held 14–25 September 2020, involved two streams. One addressed inclusive business models and value chains; and one involved reducing barriers to inclusive landscape finance.[23] Some papers from the conference were selected for inclusion in an Agropolis/CGIAR book presented at the World Summit on Food Systems in New York in September 2021 (Agrogolis/CGIAR 2021).

[23] Details can be found at http://bit.ly/FTASciCon2020; in the Book of Abstracts (http://bit.ly/FTASciCon2020Book) and the blog (http://bit.ly/FTASciCon2020Blog).

5. Conclusions and the way forward

The multiplication of sustainability initiatives has been driven by the growing complexity and diversity of conditions under which agrifood and timber supply chains operate. These encompass geographical, demographic, logistical and cultural challenges associated with global value chains as well as more specific variations in knowledge production, extension services, technology transfer, national and international legislation, credit access, value chain development, and pricing mechanisms. They involve many different types of actors, including farmers who make land-use decisions as a function of their access to land and other assets; urban consumers; environmental NGOs lobbying for change; financiers; investors; and buyers of commodities. All of them have a direct or indirect influence on land-use decisions.

Private-sector actors have increasingly defined and monitored their own sustainability performance by using certification standards or by developing their own procedures and criteria. More recently, a discernible shift toward landscape or jurisdictional approaches is seen as a way to meet sustainability goals. The growing complexity of policy regimes inevitably results in ambiguities and can lead to trade-offs between gains and losses. A recent FTA review (Wardell et al. 2021) presents a synthesis of the multiple public, private and hybrid governance initiatives that aim to promote sustainable supplies of key forest-risk commodities. Drawing on the published literature and scientific

discussions, including those held at the recent FTA 2020 Science Conference (see footnote 28), the review summarizes some of the outstanding challenges that urgently need to be addressed in order to achieve the targeted impacts.

Increasingly, the institutional arrangements that are emerging to govern global supply chains involve the inclusion of more non-state actors to enhance social and environmental governance. Non-state actors often require periodic adjustments in governance arrangements during implementation to ensure that these measures are adapting to changing circumstances and political influences. Recent experience with deforestation trends in Brazil is a case in point (Carvalho et al. 2019). Other recent research (German et al. 2020) has noted a trend in the evolution of agricultural supply chains towards more exclusionary agribusiness as governments scale back support to smallholders, as more stringent standards raise barriers to entry, and as firms streamline operations to enhance competitiveness.

Environmental NGOs are increasingly engaged as intermediaries to support companies to address social and environmental risks in the supply chain, and to help subnational governments meet their sustainability commitments (Abbott et al. 2012, 2017; Pacheco et al. 2018b; Busch and Amarjargal 2020). Such initiatives also foster partnerships between corporations and governments around shared objectives of rural low-carbon development, sustainable landscapes or jurisdictions, and deforestation-free supply chains. These partnerships may adopt different ways of functioning depending on the main actors who orchestrate them: corporations, NGOs or governments (Pacheco et al. 2017d). In addition, the perceptions of different types of stakeholders vary along each supply chain (Camargo et al. 2018).

The continued growth of a relatively small number of agricultural (e.g. soybean, palm oil, cocoa, coffee, rubber and beef) and forest commodities (primarily timber) in global trade will continue to put pressures on forests across landscapes in the tropics and subtropics throughout Latin America, sub-Saharan Africa and Southeast Asia. Such pressures are amplified by the growing domestic demand for these commodities in producer countries. The latest Forest 500 report[24] indicates that no palm oil, soy, cattle or timber company that committed itself to eliminating deforestation from its supply chain by 2020 will meet this goal (Earthsight 2020). Others have noted that "policies designed to achieve zero deforestation commitments are not being adopted or implemented at the pace needed to meet 2020 goals" (Curtis et al. 2018, 1111). This suggests that there are still many challenges to ensuring

[24] https://forest500.org/sites/default/files/forest500_2021report.pdf.

This nursery is used to produce young cocoa seedlings for the establishment of plantations.

Photo by Ollivier Girard/CIFOR

sustainable supplies of forest-risk commodities that meet private standards (Mayer and Gereffi 2010; Challies 2012; Waldman and Kerr 2014; Wardell et al. 2021).

The growth in trade over the past three decades has been matched by improved access to information on the social and environmental impacts associated with global and domestic supply chains for agricultural and forestry commodities. This is particularly the case regarding those commodities with higher exposure to civil-society scrutiny (e.g. soybean in the Cerrado in Brazil, beef in Brazil, palm oil in Indonesia, and cocoa in West Africa). This growing scrutiny comes from civil-society organizations, consumers in importing countries, international banks, and shareholders of consumer goods companies. They want producers and consumers to develop and implement a diverse array of instruments and tools to promote sustainable or deforestation-free sourcing as a way to reduce exposure to reputational, financial and regulatory risks. Multistakeholder platforms (MSPs) emerged, among other reasons, in response to criticisms of government failure in the Global South, and the amplification of "voice" in the Global

North, particularly through social media. MSPs provided a mechanism to build coalitions of interest groups through better representation of and participation by all categories of stakeholders. However, recent FTA research in Sumatra, Indonesia, by Purnomo et al. (2021) observed that the contributions of governance and the political economy to sustainability remain poorly understood. They emphasized (ibid.) that considering political-economic factors in designing and implementing commodity interventions is a must.

In particular, the development community and financiers must stop prioritizing technical and financial support for businesses at scale or with scalability potential. They need to move away from disciplinary siloes and start to embrace a systems perspective. Instead of helping big businesses become larger, their emphasis should shift to helping businesses become better. This would entail a rethinking of prevailing funding strategies and conditions; for example, by incorporating environmental and distributional indicators, and by prioritizing business support to sectors that advance the objectives of sustainable food systems (e.g. those for nutrient-rich crops with circular production potential and crops susceptible to climate shocks). See Schoneveld (in press) for a full analysis of such transformational pathways.

Moreover, the lack of substantial results from companies on tropical deforestation and the increased pressure from Western consumers (represented by both citizens and NGOs) appear to have given a new voice to states over the last two or three years in the search for workable solutions to combat deforestation. In the years to come, there will be a need to better understand and manage ambiguities and trade-offs during the implementation of complex policy regimes. The growing multiplicity and complexity of governance initiatives does not necessarily equate with greater effectiveness in terms of actions on the ground or with reduced rates of deforestation and forest degradation.

Building on the legacy of FTA's research on value chains, finance and investments over the past decade, future strategic initiatives will need to emphasize four key elements:

- strengthening partner capacities in developing countries to co-design and deliver evidence-based solutions to address supply chain and investment constraints (Leeuwis et al. 2017).

- For more information about capacity development conducted within FTA, see Highlight No.16 in this series (Wardell et al. 2021).

- strengthening engagement through a broader array of national, regional and global multistakeholder initiatives (e.g. GPSNR, GSA) and business forums (e.g. Chain Reaction Research, Accountability Framework Initiative) by co-developing knowledge products and services on the thematic issues that CIFOR-ICRAF research will continue to address;

- putting greater emphasis on subnational initiatives and interventions with broader coalitions of partners to develop, test and monitor hybrid governance regimes;

developing more rigorous outcome monitoring and evaluation systems encompassing ex-post tracer impact studies[25] and innovative territorial certification models.

[25] A tracer impact study is a retrospective analysis that takes a sample of former beneficiaries of an intervention and looks into the changes that transpired in their lives and those of their families.

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