



RESEARCH
PROGRAM ON
Forests, Trees and
Agroforestry

FTA HIGHLIGHTS OF A DECADE
2011-2021

Governing forests, trees and agroforestry for delivering on the SDGs

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.

This series was elaborated under the leadership of the FTA Director, overall guidance of an Editorial Committee constituted by the Management Team of FTA, support from the FTA Senior Technical Advisor, and oversight of the FTA Independent Steering Committee whose independent members acted as peer-reviewers of all the volumes in the series.

FTA HIGHLIGHTS OF A DECADE 2011-2021

Governing forests, trees and agroforestry for delivering on the SDGs

© 2021 The CGIAR Research Program on Forests, Trees and Agroforestry (FTA)



Content in this publication is licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0), <http://creativecommons.org/licenses/by/4.0/>

DOI: [10.17528/cifor/008224](https://doi.org/10.17528/cifor/008224)

Minang PA, Duguma LA, Leimona B, van Noordwijk M, Catacutan D, Ickowitz A, Dewi S, Johana F, Rizvi J, Sarmiento Barletti JP, Larson AM, Robiglio V, Wainaina P, Bernard F, Mandiefe SP, Foundjem-Tita D, Cerruti PO, Mutune J, Hoan DT, Alemagi D, Purnomo H, Galudra G, Villamor G and Mulyoutami E. 2021. *Governing forests, trees and agroforestry for delivering on the SDGs*. FTA Highlights of a Decade 2011–2021 series. Highlight No. 14. Bogor, Indonesia: The CGIAR Research Program on Forests, Trees and Agroforestry (FTA).

CGIAR Research Program on Forests, Trees and Agroforestry
CIFOR Headquarters
Jalan CIFOR
Situ Gede, Sindang Barang
Bogor Barat 16115 Indonesia

T +62-251-8622-622
E cgiaforestsandtrees@cgiar.org

foreststreesagroforestry.org

We would like to thank all funding partners who supported this research through their contributions to the CGIAR Fund. For a full list of the 'CGIAR Fund' funding partners please see: <http://www.cgiar.org/our-funders>.

Any views expressed in this publication are those of the authors. They do not necessarily represent the views of The CGIAR Research Program on Forests, Trees and Agroforestry (FTA), the editors, the authors' institutions, the financial sponsors or the reviewers.



FTA HIGHLIGHTS OF A DECADE
2011-2021

Governing forests, trees and agroforestry for delivering on the SDGs

Lead authors: Peter A. Minang, Lalisa A. Duguma, Beria Leimona
and Meine van Noordwijk

Contributing authors: Delia Catacutan, Amy Ickowitz,
Sonya Dewi, Feri Johana, Javed Rizvi, Sarmiento Barletti, Anne Larson,
Valentina Robiglio, Priscilla Wainaina, Florence Bernard, Serge P Mandiefe,
Divine Foundjem-Tita, Paolo Cerruti, Jane Mutune, Hoan Do Trong,
Dieudone Alemagi, Herry Purnomo, Gamma Galudra, Grace Villamor
and Elok Mulyoutami



Editorial and publication team

Editorial Committee of the Highlights Series

Vincent Gitz (Chairperson of the Editorial Committee), Michael Allen Brady, René Boot, Marlène Elias, Ramni H. Jamnadass, Christopher Kettle, Yanxia Li, Christopher Martius, Alexandre Meybeck, Peter A. Minang, Fergus Sinclair, Plinio Sist and Eduardo Somarriba.

Independent Steering Committee of FTA

Anne-Marie Izac (Chairperson of the ISC), René Boot, Susan Braatz, Linda Collette, Vincent Gitz, Florencia Montagnini, Richard Stanislaus Muyungi, Robert Nasi and Stephan Weise.

FTA Director

Vincent Gitz

FTA Highlights Support Team

Technical and scientific editing: Alexandre Meybeck, FTA senior technical advisor

Coordination of publication process, editing and layout: Fabio Ricci, FTA communications coordinator

Coordination of the peer-review process: Monika Kiczakajlo, FTA program manager

Language editing and referencing: Patricia Halladay, consultant

Layout and design: Dharmi Bradley, consultant

Acknowledgements

Thanks are due to all the FTA scientists who developed the foundations for this work.

The authors thank Anne-Marie Izac and Linda Collette for their constructive review and feedback on an earlier version of the manuscript.

The final content remains the sole responsibility of the authors.

Table of contents

Executive summary.....	4
1. Introduction.....	6
2. Good governance principles and FTA achievements.....	10
3. Conclusions and way forward.....	31
References.....	33

List of acronyms

ASEAN	Association of Southeast Asian Nations
FLEGT	Forest law enforcement, governance and trade
LULUCF	Land use, land-use change and forestry
MSF	Multistakeholder forum
NDC	Nationally determined contribution
PIM	CGIAR Research Program on Policies, Institutions, and Markets (PIM)
SDG	Sustainable Development Goal
SERNANP	Service for Natural Protected Areas (Peru)
VPA	Voluntary Partnership Agreements



Executive summary

This publication presents the results of FTA's work across the humid tropics in the area of enhancing the good governance of forests, trees and agroforestry, typically as part of landscapes that deliver on sustainable development goals. Work on the interface of the science and policy arenas focused on enabling good governance in landscapes through five principles: legitimacy and voice, strategic direction, performance, accountability and fairness. This publication presents and discusses the main achievements in terms of contributions to research, innovation and actual impact on good governance at the landscape, subnational, national and supra-national levels. A decade of FTA involvement has contributed substantively to the development of national agroforestry policies in a number of countries, including India (the world's first-ever national agroforestry policy)¹ and Nepal. Maldives, Gambia, Kenya and Rwanda have also embarked on national strategies with FTA support. The Association of Southeast Asian Nations (ASEAN) has also adopted agroforestry guidelines. In Peru agroforestry concession schemes were introduced to formalize agriculture and timber production on forest lands as a means of reducing deforestation and forest degradation, and the country also adopted a comprehensive definition of agroforestry in its National Agricultural Policy. FTA also supported the development of national bioenergy strategies in Viet Nam and Kenya. The FTA program has also significantly influenced thinking on payment for ecosystem services, coinvestment in ecosystem service stewardship, incentives, community forestry and certification of forests and tree commodities worldwide. Green growth planning approaches have also been integrated

¹ http://agricoop.gov.in/sites/default/files/National_agroforestry_policy_2014.pdf.



into subnational-level planning in Indonesia and Viet Nam. Adoption of multistakeholder forum methodologies in forest landscape planning at subnational levels in Peru, as well as community forestry approaches in Cameroon and Indonesia, also show FTA's contributions to methodological approaches. These results contribute to improved enabling institutional, political and socioeconomic environments for more effective and efficient natural resource management, and hence positively affect livelihoods in multiple countries across the humid tropics.

CIFOR reforestation with partner organization ACPRE in Mandjou, East Cameroon.

Photo by Emily Pinna/CIFOR





1. Introduction

This publication presents a decade of FTA's results in the area of enhancing good governance of forests, trees and agroforestry for delivering on sustainable development goals across the humid tropics. It complements Highlight 13 on multifunctional landscapes for sustainable development in this series (Minang et al. 2021). The Landscapes flagship of FTA had as a vision that multifunctional landscapes with trees, agroforestry and forests managed at the interface of public- and private-sector actors can support progress towards the Sustainable Development Goals (SDGs) and to achieving the aspirations of both inhabitants and external stakeholders. The primary objective was to provide the evidence base and the technical support needed to help balance economic, social and environmental objectives as landscapes, and often subnational jurisdictions, sought green growth pathways.

The flagship project endeavoured to understand and support choices and decisions in tropical landscapes relating to forest and agroforestry land management, production of tradeable commodities, vis-à-vis food, and environmental services such as water, nutrients and carbon cycles and biodiversity conservation. It also sought to close “landscape multifunctionality gaps” — many landscapes tend to operate well below their potential production potential, which is determined by hard (unavoidable) tradeoffs.

The flagship project recognized that governance is a dynamic process requiring solid understanding for scientists to effectively interact with and have an impact on policy domains around forests, trees and agroforestry

issues. As shown in Figure 1, a process-level understanding of issue attention cycles in the policy domain can be coupled to the analysis of drivers, pressures, system states, impacts and responses (DPSIR) that scientists frequently carry out. The issue attention cycle tends to separate the formulation of (ambitious) goals such as the Paris Agreement and the SDGs from discussions on the means of implementation. Power asymmetries play a large role in all stages of the DPSIR cycle. Beyond goals, however, the means of implementation, within a common but differentiated responsibility, determine whether issues get tackled effectively, or whether they receive only lip service and greenwashing efforts. Both knowledge and power shape the governance process, and windows of opportunity for change may open rarely and close rapidly; therefore, knowledge development has to try to stay ahead of the issue attention curve (Clark et al. 2016; van Noordwijk 2018, 2020, 2021).

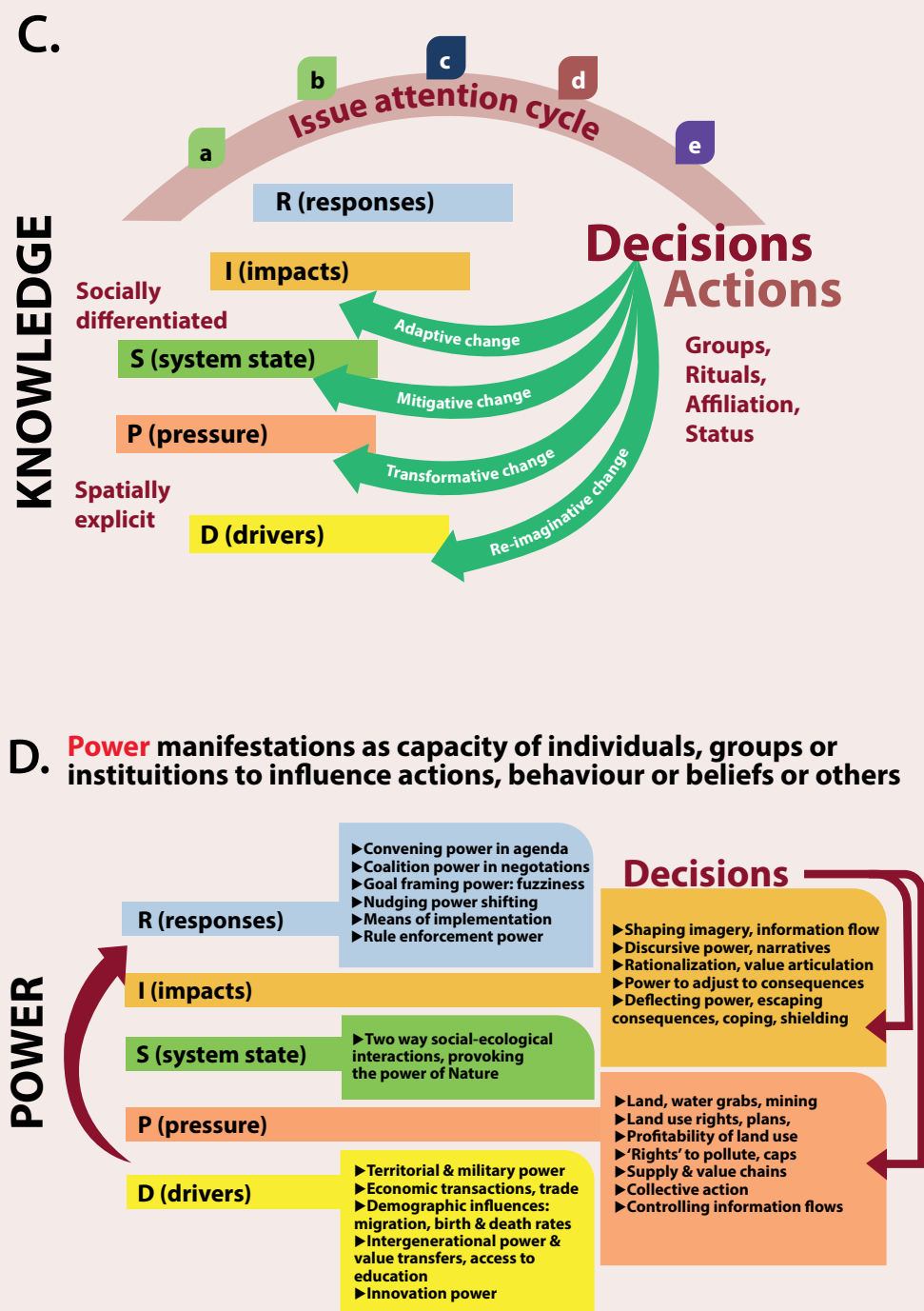
Figure 1. Schematic steps in understanding governance as a process

A. The issue attention cycle, leading B. to the articulation of goals, such as SDGs, even though these may be hard to achieve simultaneously, as clarified C. by the types of change that policies try to achieve in a drivers, pressure, system, impacts, responses cycle, with D. various types of power interacting with the process



Figure 1 continued. Schematic steps in understanding governance as a process

A. The issue attention cycle, leading B. to the articulation of goals, such as SDGs, even though these may be hard to achieve simultaneously, as clarified C. by the types of change that policies try to achieve in a drivers, pressure, system, impacts, responses cycle, with D. various types of power interacting with the process



1.1 Democracy and good governance principles

As a result, FTA's work has focused on development and deployment of “landscape democracy” as the principal means of achieving sustainable landscapes, including sustainable pathways for forests and agroforests. Landscape democracy can be defined as the operationalization of democratic and good-governance principles (such as participation and voice, strategic direction, accountability, transparency and fairness) in multistakeholder processes at the landscape level (McCall and Minang 2005; Minang et al. 2015). Landscapes are multistakeholder spaces, often characterized by diverse perspectives, interests and goals. More often than not, these interests and goals conflict, requiring participatory and highly interactive decision-making processes to bring about landscapes that deliver on SDGs in balanced ways: addressing development deficits while respecting planetary boundaries; see Highlight 1 in this series (van Noordwijk et al. 2021). The constraints to the current functioning of landscapes, however, can be addressed only partially at the landscape scale, and often require policy reform at the national and international scale (Langston et al. 2019), including at the interface with international trade in timber (Thuy et al. 2021). For more information about work on sustainable value chains and finance conducted within FTA, see Highlight No. 10 in this series (Brady et al. 2021).

This raises questions as to who should make decisions in landscapes and how and why those decisions should be made; hence, the link between democracy and landscapes and the term “landscape democracy.” Landscape governance can thus be seen as a set of relationships between the governed; i.e. civil society and the public; and the governing; i.e. government, its institutions and private-sector interests (UNDP 1997). The governability concept challenges whether such a balance can always be found (Kooiman 2010). The conditions under which self-organization by forest users can be effective in interaction with national policymakers remain contested (Ostrom 1999). In the analysis of governance at the scales of landscapes, national policy and global conventions, a number of good governance principles have been identified. These include: 1) legitimacy and voice (including participation and consensus orientation), especially for steps **a** and **b** (in Figure 1); 2) strategic direction, especially where goals are framed in step **c**; 3) performance in the use of means of implementation in step **d** (including responsiveness, effectiveness and efficiency); 4) accountability (including transparency) in step **e**; and 5) across all stages, fairness (equity and rule of law). These five aspects, building on the seminal institutional analysis by Ostrom (1990) and Vatn (2007), are addressed in various achievements of FTA as they relate to forests and landscapes governance — recognizing that these are snapshots of ongoing processes where all five aspects play a role.



2. Good governance principles and FTA achievements

Table 1 summarizes the key achievements of FTA in good governance principles.

Table 1. Summary of FTA contributions by good governance principle

Good Governance Principle	Achievements
Strategic direction; see 2.1	Supporting the delivery of agroforestry policies and strategies in India, Nepal and ASEAN
	Supporting the adoption and initial implementation of agroforestry concessions in Peru in the forestry sector, as well as the adoption of a definition in the country's National Agriculture Policy
	Innovating in subnational-level green growth planning, with successful applications in Indonesia, Viet Nam and Peru
	Learning from REDD+ readiness at the national level in Cameroon, Indonesia, Peru and Viet Nam
	Initiating discussion on the hydroclimatic relevance of forests and trees as part of the broader climate change discourse
Legitimacy and voice (including participation and consensus orientation); see 2.2	Advancing on the methodologies of multistakeholder forums
	Supporting participatory analysis of deforestation causal mechanisms by subnational actors
Performance (responsiveness, effectiveness and efficiency); see 2.3	Contributing to the global discourse on ecosystem services
	Publishing a book for practitioners and aspiring intermediaries on coinvestment in ecosystem services (bringing together 15 years of work in Asia and Africa)
	Contributing to community forestry and community-based forestry discourses
Accountability (and transparency); see 2.4	Contributing to the discourse around certification of tree commodities
	Contributing to performance-based financing approaches
	Contributing to issues of forest and timber governance
Fairness (including equity and rule of law) ; see 2.5	Contributing to the increased recognition that (perceived) fairness is an essential part of any land-use-related policy

2.1. Strategic direction

Supporting the delivery of agroforestry policies and strategies in India, Nepal and ASEAN

In 2014, through a process that involved various ministries and institutional agendas (Singh et al. 2016), India became the first country in the world to adopt a national agroforestry policy. As policies require definitions, a major challenge was to define a viable interface for agriculture and forestry, rather than a new concept, distinguished from both neighbours. India's policy of supporting new activities at the agriculture-forestry interface has already been effective in upgrading national research and development institutions, bringing agroforestry and corporate social responsibility into the *Companies Act*, establishing the National Sub-Mission on Agroforestry and the National Bamboo Mission (with a combined budget of US\$340 million), and freeing 650 farm-grown tree species from felling and transit regulations in 25 states — creating a more equitable and self-sustaining value chain for farm-grown timber. India's finance commission has further invested US\$9 billion to promote “green cover.”² The result: a 2% increase in vegetation cover, especially trees outside forests, which supply more than 70% of timber requirements. During 2015–2019, India's green cover increased by 1.8%, 86% of which was trees outside forests. Regional training and knowledge exchanges carried out with national partners enabled participants to develop roadmaps for enhanced adoption of agroforestry systems, resulting in the New Delhi Action Plan on Agroforestry (TAAS 2015). And in 2019, ICRAF's South Asia Program and partners trained 26 mid-level policymakers from Asia and Africa in agroforestry policy, research, innovation and development.

The Association of Southeast Asian Nations (ASEAN), after an extensive consultation process and a number of white papers and policy briefs by FTA scientists, adopted regional agroforestry guidelines in 2018. Soon afterward, FAO established a technical cooperation programme with ASEAN to implement the guidelines, focusing on three pilot countries: Cambodia, Lao PDR and Myanmar. With FTA scientists directly involved, a methodology for monitoring and reporting agroforestry development in the region, together with a report on status and outlook of agroforestry, is being developed to ensure strengthened ASEAN cooperation in agroforestry.

Agroforestry can increase the resilience of farming communities and contribute to adaptation to climate change by providing alternative resources and diversifying income opportunities, and can mitigate climate change by absorbing atmospheric carbon. Through FTA's work, supported by the

² In Indian policies the term “green cover” is used to designate forest and tree cover.

Climate Technology Centre and Network, Nepal became, in 2019, the second country with a national agroforestry policy.

Supporting the implementation of agroforestry concession schemes as a national policy to reconcile forest conservation, restoration and nationally determined contributions (NDCs) and to enhance the social inclusion of family farmers in the forest landscapes of Peru

Peru's agroforestry concessions³ are a legal provision in the nation's *Forestry and Wildlife Law* of 2011 that aims to integrate in the formal economy the thousands of small-scale farmers who have encroached on public forest land. The concessions grant land titles to farmers on the condition that they commit to zero deforestation and engage in agroforestry. The approach combines avoided deforestation with restoration, and as a formalization scheme it provides access to the legal timber market, credits and extension support. Support for the process by FTA scientists can be separated into three phases:

1. Engaging with the national Forest Service and regional government in the Amazonian departments of San Martín and Ucayali, FTA scientists supported the formulation of the implementation regulations, approved in 2015, and of the guidelines in 2017; evidence was provided on the heterogeneity of smallholder land use and resource management systems, in particular agroforestry practices in deforestation frontier contexts, and on scaling challenges related to small-scale forestry and plantation management by smallholders.
2. FTA scientists analyzed the technical guidelines and tools to address gaps in the management and supervision capacity of local authorities. The relevance of the agroforestry concessions to reducing deforestation and enhancing ecosystem services and livelihoods at the forest margin became clear, with the estimated number of potential beneficiaries being more than 120,000 families and the mitigation potential that combined avoided deforestation (roughly 500,000 ha) and agroforestry and restoration (about 1 million ha of deforested land). Evidence of this potential scope fostered introduction of agroforestry concessions in the land use, land-use change and forestry (LULUCF) NDCs and in the land allocation process (to be supported by the Joint Declaration Mechanisms between Germany and Norway for REDD+) and the implementation of Peru's National Forestry and Climate Change Strategy. However, despite the evidence of estimated benefits from forest conservation, mitigation of climate impacts and alignment with the global ambition of landscapes managed by smallholders with zero deforestation and improved productivity, it is only since 2019 that implementation has started by early movers such

³ Cesiones en Uso para Sistemas Agroforestales (CUSAF).

CIFOR consultant gets information about community frontiers.

Photo by Marlon del Aguila Guerrero/
CIFOR



as the government of the San Martin Department. First advancements showed major challenges to implementation, which involved strategic barriers to scaling up agroforestry concession regulations. These barriers included technical issues in registering and mapping farms and in monitoring avoided deforestation and agroforestry establishment; financial and socioeconomic challenges to registered farmers in complying with contractual requirements; prioritization of areas of interventions; inconsistent criteria for the eligibility of farmers and of suitable agroforestry practices; nonexistent standards for supervision by the national forest monitoring agency; and lack of technical assistance for farmers on sustainable land management practices and small-scale forestry.

3. In partnership with the Peruvian Society for Environmental Law, the Global Green Growth Institute and Solidaridad International, FTA scientists implemented a series of pilots to generate information on the technical and socioeconomic context in order to scale up the use of agroforestry concessions as a policy instrument. This included the formulation of national standards and procedures, normative and regulatory improvements and a national plan for agroforestry concessions that will cover aspects related to granting processes, compliance, adoption, financial models and benefit-sharing schemes.

Innovating in subnational green growth planning

Through a decade of work, FTA has developed a green growth planning tool called Land-Use Planning for Multiple Environmental Services (LUMENS). The tool started out as an opportunity cost methodology for REDD+ — it was published in 2011 in collaboration with the World Bank (White et al. 2011). The opportunity cost methodology was applied in more than 30 countries as part of the REDD+ assessment and planning processes. In its development into LUMENS, it has been applied in green growth planning by five provinces in Indonesia: Aceh, Jambi, Papua, South Sumatra and West Papua (see Figure 2). A further application took place in Lam Dong Province in Viet Nam. In the early days, it was adopted for use throughout Indonesia by the national government for provincial planning of emission reductions. It was also adopted in Peru, with training for central ministry staff and applications in at least two regions.

LUMENS is a framework with user-friendly, cost-effective and publicly available software that allows inclusivity, integration and informed negotiation of land use within a landscape. It is a spatially explicit, semi-agent-based model that can accommodate a broad range of scenarios. While it is based on a scientifically sound model, the requirement for input data is minimal,



Map: Freepik

Figure 2. Green growth policy documents approved and published by provincial governments in Indonesia, facilitated by FTA scientists

recognizing the scarcity of reliable data in developing countries. The modular design of LUMENS allows the developer or contributor to add more facilities, indicators or modelled processes to suit users' needs, and allows users to run only the relevant parts of the software, based on their objectives. LUMENS was developed specifically to empower multistakeholder negotiations for planning sustainable landscapes that can support livelihoods and development while maintaining and restoring environmental services, especially in tropical countries.

Learning from REDD+ readiness

In terms of strategic governance dimensions from innovations in forest management, FTA worked with funding from the Norwegian Agency for Development Cooperation on Reducing Emissions from All Land Use (REALU) projects in a comparative study of REDD+ readiness across the humid tropics. This resulted in a special issue of the international journal *Climate Policy* in 2014. The articles in this special issue examined and sought to explain the choices of countries in the development of national REDD+ infrastructure as part of readiness. At the heart of this examination is the question of how interactions among government, the private sector, and civil society have negotiated or not negotiated these choices and whether the interests and potential benefits of stakeholders have been taken into account. In the special issue Alemagi et al. (2014), Agung et al. (2014), and Robiglio et al. (2014) present detailed country-level assessments of readiness from Cameroon, Indonesia and Peru, respectively. In addition to using the framework of a comparative article (Minang et al. 2014), each of these country articles discusses how national circumstances have influenced the REDD+ readiness process, such as motivations and ambitions, forest stakes, political environment/traditions, previous experiences in payment for ecosystem services, and power relations between government and civil society.

Minang et al. (2014) present a synthesis of a global comparative design and analysis of efforts to achieve REDD+ readiness at the national level, and a summary of the results for four countries: Cameroon, Indonesia, Peru and Viet Nam. The synthesis articulates and uses a universally applicable framework to compare and discuss the performance of each country under six REDD+ national functions: planning and coordination; policies, institutional and legal frameworks; measurement, reporting and verification (MRV) and audit; financing; benefit distribution; and demonstration and pilot project development. This lead article also compares and contrasts the four country case studies and sheds light on emerging REDD+ readiness patterns and issues as well as lessons for improving REDD+ globally.

Two additional articles address very specific aspects of REDD+ readiness, notably institutional arrangements for REDD+ in Cameroon (Ngendakuma et al. 2014), and private-sector involvement in REDD+ at the subnational level (Bernard et al. 2014). The latter presents a case study of the Kasigau Corridor REDD+, one of the early voluntary-market-based projects.

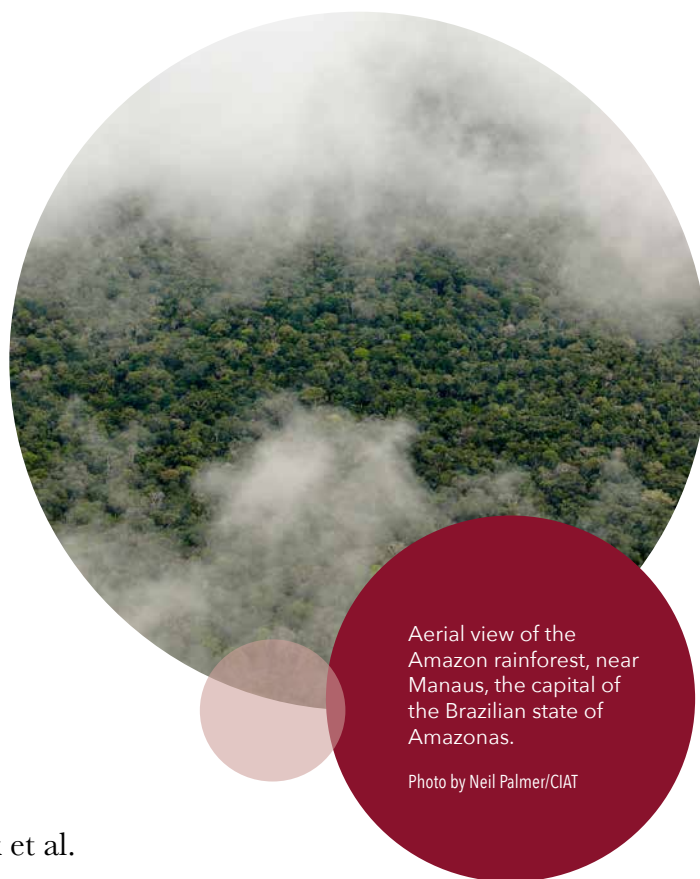
Together, the articles in the special issue emphasize a number of lessons. First, the engagement of many stakeholders in the REDD+ readiness processes showed that there is indeed a very considerable challenge to shift from the status quo that is associated with the current, generally high level of emissions to a different trajectory; i.e. some path dependency. Second, there is a need to rethink the national-level focus of readiness. Currently, little attention and/or value is given to subnational-level processes. Third, REDD+ readiness actors and countries need to pay more attention to policies that can address the drivers of deforestation and systematically address the knowledge, skills and capacity development required to deliver on such policies. For more information about work on REDD+ combating climate change with forest science conducted within FTA see Highlight No. 11 in this series (Martius and Duchelle 2021).

Initiating discussion on the hydroclimatic relevance of forests and trees as part of the broader climate change discourse

In a significant review Ellison et al. (2017) suggest that the direct effects of trees and forests conversion via rainfall cooling may be more important than the well studied effects through global carbon balance — thereby introducing a new strategic dimension to the climate discourse. Planting trees has long been an expression of intent to do something of substance in the climate change debate; scientists have found a new rationale for this. As trees cool the planet, they may also promote rainfall. Two ingredients of rainfall are: i) water vapour in the atmosphere, to which trees and wetlands make an important contribution and in quantities that can be measured; and ii) a starting point for condensation of vapour into cloud droplets and raindrops. Trees are a source of volatile compounds that can become cloud condensation nuclei, and also a source of bacteria that form ice nuclei.

As forests modify and contribute to atmospheric flows of moist air, they influence downwind rainfall. While coastal areas derive most of their rainfall from oceanic evaporation, downwind continental surfaces are more dependent on upwind terrestrial sources of atmospheric moisture. On average, 40% of rainfall over land is recycled from evapotranspiration over

land surfaces. There is evidence that these patterns shape long-distance dependencies such as those between the Congo Basin and East Africa, providing rain to the Ethiopian Highlands and the Sahel; the Amazon-supporting rain in northwest Argentina; and mainland Southeast Asia feeding atmospheric moisture to China. This evidence suggests shifting the discourse from a carbon-centric to a hydroclimatic focus with respect to forests, trees and agroforests (van Noordwijk et al. 2015).



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

Photo by Neil Palmer/CIAT

In many areas where water resources are declining, the attribution of the problems involve both climate change and land degradation. There is a need for diagnostic studies to make clear what can be expected from restoration, as total water yield and flow buffering tend to respond differently and over different temporal periods (van Noordwijk et al. 2017b). If local rainfall is influenced by surrounding land cover, as current hypotheses suppose, most existing feasibility studies may need to be adjusted. The assumption that upper watersheds are the main problem in declining water resources may be an oversimplification. Ongoing involvement in a watershed in East Java, Indonesia, deals with overuse of water in artesian wells that are cheap to construct but lack outflow control (Khasanah et al. 2021). The collective action needed to jointly manage groundwater as an “invisible” resource, however, is not easily achieved, while existing policies focus on surface water, rather than groundwater or atmospheric moisture. As a method to achieve a common perception and diagnosis of problems in such cases, the use of “serious games”⁴ (van Noordwijk et al. 2020) is increasing.

⁴ As defined by Michael and Chen (2005), serious games are those that do not have entertainment, enjoyment or fun as their main purpose. The “seriousness” of these games refers to their content and objective: to educate, train and inform.

2.2 Legitimacy and voice (participation and consensus orientation)

Advancing on multistakeholder forum methodologies

The multistakeholder forum (MSF) concept has gained attention around the world because of its potential to improve collaboration among actors to address complex challenges. Building on this research, FTA scientists worked with participants in two MSFs in Peru (the management committees of two protected areas) and one MSF in Indonesia (Provincial Council on Climate Change in East Kalimantan) to develop *How are we doing?*, a Policies, Institutions and Markets-PIM and FTA-supported tool for participatory reflective monitoring and adaptive learning in MSFs (Sarmiento Barletti et al. 2020).

A specific feature of this tool is that it is designed to be used by forum participants and organizers themselves, not by external evaluators. Another unique feature is that it goes beyond a simple assessment of indicators: after expressing their level of agreement with a set of statements (such as “Our forum includes everyone who should be present” or “We are all treated as equals in our forum”), participants are invited to discuss and agree on improvements.

During the tool’s development and implementation with two management committees in Peru, participants commented on its potential. In partnership with the Service for Natural Protected Areas (SERNANP), CIFOR facilitated the development of a second version of the tool specifically for SERNANP’s 76 management committees (SERNANP 2020). The tool was customized during decentralized participatory workshops, then validated through workshops with SERNANP staff. When it was tested by six additional management committees, participants noted its positive impact. During follow-up interviews that were part of an evaluation study, participants said that the tool enabled a safe environment for discussion and raised awareness of the need to empower historically marginalized actors such as Indigenous Peoples and women (Sarmiento Barletti et al. 2021). *¿Cómo vamos?*, the version of the tool developed for SERNANP’s 76 management committees, has been published by SERNANP as an official government document and will be implemented in all management committees of protected areas in Peru (Sarmiento Barletti et al. 2021).

Other FTA scientists analyzed and piloted the role of an MSF as an intermediary for payment for watershed services (Amaruzaman et al.

2017a, 2017b) in Indonesia. The role of intermediary in a payment for ecosystem service (PES) scheme includes providing baseline information to both ecosystem service buyers and sellers, facilitating information exchange, being involved in program design and planning, mediating negotiation, and organizing program monitoring and evaluation. The Indonesian government law (Law 32/2009) on environmental protection and management states that PES is one of the incentive schemes on environmental protection and management, and its related regulation states that a PES intermediary is an essential element for making the scheme operate on the ground. For payments for watershed services, by regulation the generic, multistakeholder Watershed Forum has the potential to be a PES intermediary in Indonesia. Since 2002, FTA scientists have been supporting the subnational watershed forums to ensure that these MSFs can have more active and optimal roles in facilitating PES schemes, from their development to monitoring and evaluating their performances.



Multi-stakeholder
forum, Peru. Amarakaeri
Communal Reserve MSF.

Photo by Pavel Martiarena/CIFOR

Participatory analysis of deforestation mechanisms at the subnational level

Implementing a system approach informs the collaborative design of regional low-carbon emission rural development strategies (Estrategias Regionales Desarrollo Rural Bajo en Emisiones). Between 2019 and 2020 FTA scientists in Peru designed, tested and implemented a methodology called Drivenet for the collaborative analysis of the causal mechanisms of deforestation. The methodology was adopted by a consortium of national and international NGOs, including Earth Innovation, Conservation International, Solidaridad International and other national partners. The consortium worked with the regional governments of seven Amazonian regions, under the umbrella of Governors' Climate and Forests Task Force jurisdictional approaches to REDD+ and low carbon development, implemented to inform the collaborative design of low carbon emission rural development strategies. The process was completed in 2020, and seven strategy documents have been formulated and are currently under approval by the regional governments. The regions of San Martin and Ucayali have already approved them.

Campamento Neshuya, Ucayali, Perú: Ivan Tapullima has been living in the community for 21 years. He recently sold some of the largest trees on his land to loggers after extracting them; now he is responsible for collecting the lower quality wood.

Photo by Marlon del Aguila Guerrero/CIFOR



2.3. Performance (responsiveness, effectiveness and efficiency)

Through ten years of work on the governance of ecosystem services, FTA has made significant contributions. Most of the work was done in the area of payment for ecosystem services. Payment for ecosystem services programs use direct incentives to improve the environmental impacts of private land-use decisions. A major debate has taken place on the economic interpretation of PES as a way to financially internalize the externalities of individual decision making (Wunder et al. 2018), versus a more social interpretation as a co-investment in stewardship (van Noordwijk et al. 2012; Leimona et al. 2015b). In parallel with that is a debate on how the valuation of ecosystem services can best be approached: in economic terms, or in a more pluralistic way, with multiple metrics and a stronger emphasis on the process rather than the final numbers generated (Zafra-Calvo et al. 2020).

A book on co-investment in ecosystem services

A publication on global lessons from payment and incentive schemes by Namirembe et al. (2017) discusses key lessons from the various development stages of landscape stewardship for ecosystem services provision. It focuses particularly on agricultural landscapes in Africa, Asia and Latin America, which have not featured prominently in the existing literature. A host of rich and diverse empirical cases are the result of more than a decade of field experience with Pro-poor Rewards for Environmental Services in Africa (PRESA) and Rewarding the Upland Poor for Environmental Services (RUPES) in Asia, two projects coordinated by FTA partners. Namirembe et al. (2017) discuss the gaps between the theory and the implementation of operational and sustainable ecosystem service incentive-based mechanisms on the ground. It provides and reviews arguments as to why specific forms of PES schemes (including pro-poor payments, rewards, and co-investment) can be viable approaches to sustainable land-use practices.

To this end, Namirembe et al. (2017) :

- provide new insights that support development practitioners with appropriate leverage points so they can increase the potential of PES schemes to deliver their desired outcomes;



Aerial view of the landscape around Halimun Salak National Park, West Java, Indonesia.

Photo by Kate Evans/CIFOR

- stimulate debate among scientists and analysts about PES as a theory of change in the developing-world context and where new models or knowledge are needed;
- recommend appropriate interventions for policymakers to apply PES as a tool for sustainable land governance and management in contexts where poverty is rampant, business activity is scarce and environmental funds need to be better targeted in providing ecosystem services.

The *Negotiation-support toolkit for learning landscapes* by van Noordwijk et al. (2013) showcases 49 methods and computer software that help create sustainable landscapes. The book presents the interconnectedness of the tools and the authors' underlying conceptualization of the constantly evolving set of issues.

An additional book, *Sustainable development through trees on farms: Agroforestry in its fifth decade*, by van Noordwijk (2019) also focuses on ecosystem services (ES) within agroforestry systems as well as the trade-offs that exist within agroforestry systems. It further explores policies and policy frameworks for ES enhancement. It pays particular attention to PES as an instrument in the ES policy arena, among other incentives. The book draws on lessons from ICRAF's 40 years of agroforestry.

A set of publications explored auctions as an approach to effective and efficient PES. An auction offers an approach to efficiently allocate contracts among least-cost landholders, which can improve overall cost effectiveness. This research compared the results of two case studies that used auctions to allocate payment for environmental service contracts in Indonesia and Malawi (Ajayi et al. 2012), and investigated the socioeconomic and institutional contexts that led to smallholders' auction winning and eventual compliance using linear mixed-effects models, and post-auction and post-contract surveys (Leimona and Carrasco 2017). It also tested a group-level auction that accommodated collective decision-making in payment levels for the scheme (Leimona et al. 2018). The analysis shows that by allowing the group members to communicate with each other, they shared knowledge and value. This knowledge and value sharing encompasses how they understand the competitive bidding process, how their bids can influence the overall outcomes of winning or losing the conservation contracts, and most importantly, how farmers share their conservation values since the agricultural conservation efforts of PES benefit not only the external actors but the farmers themselves (Leimona et al. 2020). Last, by applying the boundary work framework in bridging between research communities and across the gap between action and policy-making, FTA scientists examined the process of knowledge co-production and evaluated its effectiveness in supporting the negotiation process of four cases of payment for watershed services in Indonesia (Leimona et al. 2015a).

FTA also contributed to additional key publications on the concept of incentives and potential applications (Minang 2018); case studies of PES across Africa (Namirembe et al. 2014); and a comprehensive review of PES and the implications for moving towards a co-investment paradigm (van Noordwijk et al. 2012). These publications draw some of the most far-reaching field-based lessons in the incentives and PES context to date.

Community forestry and community-based forestry discourses

A special issue in the journal *Ecology and Society* in 2018/2019, as well as other papers, addressed community forestry governance. A range of forest management models have been adopted: participatory forest management (PFM) and collaborative forest management (CFM) in Ethiopia; PFM in Kenya; the village land forest reserve (since 1999), joint forest management (JFM), and community forest reserve (CFR) in Tanzania; CFM and communal forest management in Uganda; the community forest (CF) model (primarily) in Cameroon; and village forests (hutan desa) in Indonesia. See Figure 3. The village forest (hutan desa) concept in Indonesia has also been the subject of research and impact work in FTA, with mixed conclusions. The hutan desa concept has been observed to considerably reduce forest degradation and deforestation rates to very low levels, currently 0.84%, but the rules are seen as too restrictive by local stakeholders (De Royer et al. 2018; van Noordwijk 2020).

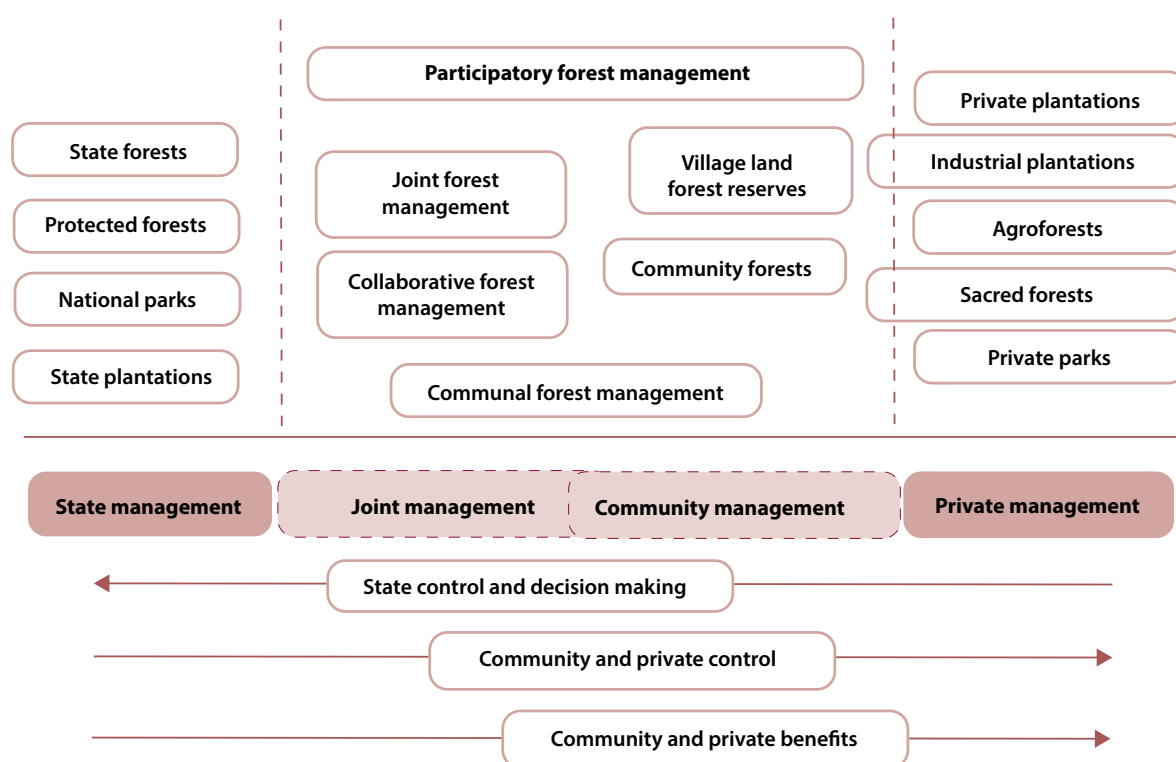


Figure 3: Different forest management models and the position of various community based forest management (CBFM) schemes.

The arrows indicate the direction along which the attribute continues to change. Note that participatory forest management captures both joint management and community management. Source: Duguma et al. 2018a.

Overall, community forest and community-based forestry models were expected to deliver on the desired protection and social and economic benefits when well managed, although each model had strengths and weaknesses. Community forest contracts have made a marginal contribution to the involvement and livelihood improvement of forest-adjacent communities. To improve these forest management model's effectiveness and contribution, it is vital to shift the focus to capacity building as well as empowering the local communities within the context of community forests (Duguma et al. 2018a). Real community involvement in forest management, enhancing forest conservation, and livelihood enhancement cannot be decided by top-down models.



Community involvement in forest management, Uganda.

Photo by John Baptist Wandera/CIFOR

In a special issue of *Ecology and Society* (2018–2019) articles focused on various aspects of community forestry and community-based forestry in Africa. Duguma et al. (2018a) reviewed the evolution of the community forestry concept across several countries, including Ethiopia, Uganda, Cameroon, Tanzania and Kenya. Minang et al. (2019) drew lessons from 20 years of community forestry in Cameroon. Lescuyer et al. (2019) reviewed developments in community forestry in DRC to date. Other issues addressed via case studies include equity (Essoungong et al. 2019), governance (Piabuo et al. 2018), social enterprise and community forestry (Foundjem-Tita et al. 2019), and the potential for community forestry contribution to REDD+ (Bernard and Minang 2019).

Chomba et al. (2015) explored community forestry in Kenya, focusing on issues around power imbalances and representation. For example, in the case of Kenya, national forest policies and actors transferred minimal powers to local communities to allow them to execute forest protection and conservation roles, while maintaining central legislative powers and control of economic benefits. Overall, representation within the community forestry associations was highly skewed in favour of small and already powerful local elites who were elected because they had more social and economic capital.

2.4. Accountability (and transparency)

The discourse around certification of tree commodities

A special issue of the *International Journal of Biodiversity Science, Ecosystem Services & Management* on certifying environmental social responsibility included an analysis of whether certification made a relevant contribution to making production systems more sustainable or was primarily a means of shifting blame to non-certified others (Mithöfer et al. 2017b).

The special issue featured articles addressing timber (Savilaakso et al. 2017), oil palm (van Noordwijk et al. 2017a), coffee (Bray and Neilson 2017), cocoa (Mithöfer et al. 2017a), and rubber (Kennedy et al. 2017). The issue introduced a conceptual framework that helped all the articles address the underlying issues (Mithöfer et al. 2017b). The framework article brings together some key strands of literature to bear on the analysis, including: (1) the issue-attention cycle as a schematic representation of public concerns shaping policy responses; (2) the “management swing” potential, defined as the gap between best and worst current production systems and the basis for defining standards; and (3) global value chains that link distant producers and consumers, and the power relations along these chains, including standards and certification. While the set of articles in the issue helps meet the gaps in certification literature overall, the authors concluded that current certification provides only part of the solution, with certification not found to attract new certifiers or to significantly increase volumes certified.

The special issue also contributed to the repository of knowledge and learning by combining research on the swing potential for management practices and governance systems. The current set of research also combines to focus on what had so far often been considered separate problems. In addition, the special issue found that despite current efforts to develop context- and commodity-specific sustainability standards and certification, these have not always corresponded to more sustainable impacts on the ground. Thus, it remains elusive to what degree certification is about “shifting the blame” to non-certified producers or whether (possibly on a different, longer time frame) it also contributes to a reduction of the issue that gave rise to the public debate in the first place (Leimona et al. 2017).

Performance-based financing approaches

The five-year Dryad project financed by DFID in partnership with four local NGOs was an experiment in deploying public finance to de-risk and prepare

community forest enterprises in Cameroon for private investment. It used a performance-based finance approach that provided better access to finance to catalyze sustainable enterprises of forest products and services for the benefit of forest communities.

Conditionality (i.e. community forestry enterprises access finance only if they meet performance targets); a transparent monitoring system, and accompanying technical support on enterprise management, governance, and agriculture and forestry know-how were the main features of the model. Dryad successfully supported 29 community forest enterprises, registering a failure rate of only 6% in a country where 90% of all SMEs fail in the first year. It also created 470 full-time jobs, enabled progress towards 50% of production targets by Year 2 of operations and trained more than 1,500 people. Enterprises were also beginning to plough benefits into community projects (Duguma et al. 2019). Substantial potential exists for scaling up Dryad given its success.



Planting Gnetum (okok) in the village of Minwoho, Lekie, Center Region, Cameroon.

Photo by Ollivier Girard/CIFOR

Forest and timber governance issues

Illegal logging is a growing major challenge in timber-producing countries in the tropics and subtropics. Many argue that the underlying cause is the weak governance in the producer countries (Tacconi 2007). An FTA-supported study, Piabuo et al. (2021), examined the relations between illegal logging and governance attributes, comparing African and Asian timber-producing countries. The study further explored how the combined effects of illegal logging and governance affect carbon emissions. Generally, illegal logging by small-scale loggers and collusive corruption have been identified as some of the principal mechanisms that facilitate the trade in illegally logged wood, coupled with poor institutional frameworks for enforcement of laws and policies. However, differences were observed between Asian and African timber-producing countries. In Asia, it was found that there has been significant improvement in tackling illegal logging through governance improvements; e.g. through certification and compliance with Forest law enforcement, governance and trade (FLEGT) protocols. This does not mean the problem is solved, however. In Africa, on the contrary, illegal logging remains a rampant problem due to weak governance measures and ineffective institutional mechanisms, which continue to aggravate corruption and hence illegal logging. As illegal logging increases, the resulting carbon emissions also increase as the loggers cut down more trees.



Curbing illegal logging still remains a major pathway to saving the forests in tropical forested countries. But this effort also needs strong support from the timber-importing countries that remain the main market targets. In this regard, the effort by the European Union is to be encouraged, especially through the FLEGT mechanism. This is shaping the narratives around how only legal timber should make it to Europe. It is also important that the benefits of legal timber making it to European markets trickles down to the communities and smallholders who produce the timber. In 2017, the European Parliament supported a study (Minang et al. 2017), that explored whether FLEGT's Voluntary Partnership Agreements (VPAs) are having any effect on forest governance and community livelihoods. The findings from the study revealed that even though the FLEGT mechanism has positive effects on transparency, accountability and overall forest governance in Africa, the benefits to local communities are minimal. Thus, the problem of small-scale illegal logging activities remains a challenge. Inasmuch as policy level measures are needed, the above study underscores the need for measures to curb illegal logging that reach the lowest level of actors; e.g. small-scale timber loggers. Support for and deregulation of farm-grown timber, as operationalized in India's agroforestry policy and in policy change in Indonesia, may be needed to complement FLEGT actions.

2.5. Fairness (including equity and rule of law)

Increased recognition that (perceived) fairness is an essential part of any land-use-related policy

The fifth aspect of good governance — the perceived fairness of rules and the way they are implemented — may well be the most challenging. Attempts to find precisely measurable attributes, such as the distribution of costs and benefits under the heading “equity,” quantifiable in Gini coefficients, are relevant, but cover only part of fairness perceptions (van Noordwijk et al. 2012). Fairness in this context may have three dimensions: vertical (the relations between a local community and the state and/or external stakeholders); horizontal (within the local community); and the relationship between humans and nature.

In the vertical dimension, norms for Free and Prior Informed Consent (FPIC) have emerged to increase the quality of and trust in a fair quid pro quo in interactions with local communities; for example, where government-sanctioned concessions of forest or other land resources are acquired by private-sector agents. FPIC concepts became part of the REDD+ governance

discourse (Pham et al. 2015) and of certification of commodities such as palm oil (van Noordwijk et al. 2017a). The cultural context of countries can influence notions of justice between the state and local communities, as was explored in the case of China's sloping land conversion programme (He and Sikor 2015).

In the horizontal dimension, the distribution of costs and benefits in relation to wealth (or poverty) has to deal with the social acceptability (in the local context) of differing access to and control over land, water, forests and access to markets. The differences can be defined in terms of ethnicity (with the migrant/local distinction contingent on vertical fairness; see Galudra et al. 2014), gender (Villamor et al. 2014; Mulyoutami et al. 2020) and social class (e.g. existing land access in relation to participation in social forestry programmes).

The third fairness dimension is determined by the way the human-nature relationship is articulated and communicated, with "instrumental" (anthropocentric) values such as ecosystem services or nature's contributions to people as a subset of the wider concept of "relational values" (van Noordwijk 2021). The recent report, *Making peace with nature* (UNEP 2021) describes the current climate, biodiversity and pollution emergencies as unjust appropriation of the planet by humans, and proposes a partial retreat to give more space to nature as part of "peace negotiations."



3. Conclusions and way forward

FTA has supported and contributed to positive and constructive changes in the governance of forests, trees and agroforestry in many ways, through discourses and policies at the global level, and policies at regional and country levels as well as decision making at management unit, community and landscape levels. However, a couple of potential areas remain, for which further research is needed:

- The role of technology in the governance of forests, trees and agroforestry: The growth of social media, mobile technology and other technologies could massively impact transparency, participation, accountability and other tenets in natural resource management. Understanding how, when, where and of whom to ask questions in relation to these dynamics would be useful for planning and decision making.
- The growing role of the private sector: Understanding how the increasing technical and financial involvement and influence of corporations in forests and land management will affect policies, decision-making and trends will be critical. This will have consequences for the role of land in climate change, food security and biodiversity debates and policies. The implications of private-sector engagements and investments to value chains and landscapes also need attention as private-sector power and influence grows.

- Challenges to democracy, good governance and associated principles in enhancing sustainable natural resource management. The rise of populism, nationalism and repressive regimes — and the growth in size and influence of governments worldwide and how these changes affect the democratic good governance of natural resources — need attention.
- Understanding and enhancing cross-sectoral decision making and actions as well as cross-scale (national-subnational-local) efforts will be critical for improved governance of landscapes and value chains. Tremendous work is needed in both these areas going forward.

Last, new approaches such as performance-based finance and blended financing, as well as existing approaches such as rewards for ecosystem services, represent large stakes in the future of forest trees and agroforestry; hence, they are worthy of continued attention.

References

- Agung P, Galudra G, van Noordwijk M and Maryani R. 2014. Reform or reversal: The impact of REDD+ readiness on forest governance in Indonesia. *Climate Policy* 14(6):748–768. <https://doi.org/10.1080/14693062.2014.941317>.
- Ajayi OC, Jack BK and Leimona B. 2012. Auction design for the private provision of public goods in developing countries: Lessons from payments for environmental services in Malawi and Indonesia. *World Development* 40(6):1213–1223. <https://doi.org/10.1016/j.worlddev.2011.12.007>.
- Alemagi D, Minang PA, Feudjio M and Duguma L. 2014. REDD+ readiness process in Cameroon: An analysis of multistakeholder perspectives. *Climate Policy* 14(6):709–733. <https://doi.org/10.1080/14693062.2014.905439>.
- Amaruzaman S, Leimona B and Rahadian NP. 2017a. Maintain the sustainability of PES program: Lessons learnt from PES implementation in Sumberjaya, Way Besay Watershed, Indonesia. In Leimona B, Minang P, Namirembe S and van Noordwijk M. eds. *Co-investment in ecosystem services: Global lessons from payment and incentive schemes*. Nairobi: World Agroforestry (ICRAF). https://www.worldagroforestry.org/sites/default/files/Ch36%20Maintain%20Sustainability%20PES_ebookB-DONE.pdf.
- Amaruzaman S, Rahadian NP and Leimona B. 2017b. Role of intermediaries in the payment for environmental services scheme: Lessons learnt in the Cidanau watershed, Indonesia. In Leimona B, Minang P, Namirembe S and van Noordwijk M. eds. *Co-Investment in Ecosystem Services: Global Lessons from payment and incentive schemes*. Nairobi: World Agroforestry (ICRAF). https://www.worldagroforestry.org/sites/default/files/Ch35%20Role%20of%20Intermediaries%20Cidanau_ebookB-DONE.pdf.
- Arler F. 2011. Landscape democracy in a globalizing world: The case of Tange Lake. *Landscape Research* 36(4):487–507. <https://doi.org/10.1080/01426397.2011.583009>.
- Bernard F and Minang PA. 2019. Community forestry and REDD+ in Cameroon: What future? *Ecology and Society* 24(1):14. <https://doi.org/10.5751/ES-10708-240114>.
- Bernard F, Minang PA, Adkins B and Freund JT. 2014. REDD+ projects and national-level readiness processes: A case study from Kenya. *Climate Policy* 14(6):788–800. <https://doi.org/10.1080/14693062.2014.905440>.
- Brady M, Louman B, Wardell DA, Gallagher E, Lescuyer G, Pacheco P, Piketty MG and Schoneveld G. 2021. *Sustainable value chains, finance and investment in forestry and tree commodities*. FTA Highlights of a Decade 2011–2021 series. Highlight No. 10. Bogor, Indonesia: CGIAR Research Program on Forests, Trees and Agroforestry (FTA). <https://doi.org/10.17528/cifor/00822>.

- Bray JG and Neilson J. 2017. Reviewing the impacts of coffee certification programmes on smallholder livelihoods. *International Journal of Biodiversity Science, Ecosystem Services & Management* 13(1):216–232. <https://doi.org/10.1080/21513732.2017.1316520>.
- Catacutan DC, Finlayson RF, Gassner A, Perdana A, Lusiana B, Leimona B, Simelton E, Öborn I, Galudra G, Roshetko JM, et al. 2018. ASEAN guidelines for agroforestry development. Jakarta: ASEAN Secretariat. <https://asean-crn.org/wp-content/uploads/2019/09/2018-ASEANGuideline-agroforestry.pdf>.
- Clark WC, Tomich TP, Van Noordwijk M, Guston D, Catacutan D, Dickson NM and McNie E. 2016. Boundary work for sustainable development: Natural resource management at the Consultative Group on International Agricultural Research (CGIAR). *PNAS* 113(17):4615–4622. <https://doi.org/10.1073/pnas.0900231108>.
- Colfer CJP, Pfund JL, Andriampandry E, Asaha S, Boucard A, Boissiere M, Feintrenie L, Sunderland TCH, Urech Z, Vihemaki H, et al. 2011. An introduction to five tropical landscapes, their people and their governance. In Colfer CJP and Pfund JL. eds. *Collaborative governance of tropical landscapes*. London: Earthscan. <https://www.cifor.org/knowledge/publication/3220/>.
- Chomba SW, Nathan I, Minang PA and Sinclair F. 2015. Illusions of empowerment? Questioning policy and practice of community forestry in Kenya. *Ecology and Society* 20(3). <https://doi.org/10.5751/ES-07741-200302>.
- De Royer S, Van Noordwijk M and Roshetko JM. 2018. Does community-based forest management in Indonesia devolve social justice or social costs? *International Forestry Review* 20(2):167–180. <https://doi.org/10.1505/146554818823767609>.
- Duguma LA, Atela J, Ayana AN, Alemagi D, Mpanda M, Nyago M, Ntamag-Ndjebe CN, Minang PA, Nzyoka J and Foundjem-Tita D. 2018a. Community forestry frameworks in sub-Saharan Africa and the impact on sustainable development. *Ecology and Society* 23(4). <https://doi.org/10.5751/ES-10514-230421>.
- Duguma LA, Minang PA, Foundjem-Tita D, Makui P and Piabuo SM. 2018b. Prioritizing enablers for effective community forestry in Cameroon. *Ecology and Society* 23(3). <https://doi.org/10.5751/ES-10242-230301>.
- Duguma LA, Minang P, Foundjem-Tita D, Mandiefe P and Tchoundjeu Z. 2019. Prospects for performance based financing of community forestry in Cameroon. Technical Brief No. 1. Nairobi: World Agroforestry (ICRAF). <http://apps.worldagroforestry.org/downloads/Publications/PDFS/TB19001.pdf>.
- Ellison D, Morris CE, Locatelli B, Sheil D, Cohen J, Murdiyarso D, Gutierrez V, van Noordwijk, Creed IF and Pokorny J. 2017. Trees, forests and water: Cool insights for a hot world. *Global Environmental Change* 43:51–61. <https://doi.org/10.1016/j.gloenvcha.2017.01.002>.

- Essougong UPK, Foundjem-Tita D and Minang PA. 2019. Addressing equity in community forestry: Lessons from 20 years of implementation in Cameroon. *Ecology and Society* 24(1). <https://doi.org/10.5751/ES-10656-240109>.
- Foundjem-Tita D, Duguma LA, Speelman S and Piabuo SM. 2018. Viability of community forests as social enterprises. *Ecology and Society* 23(4). <https://doi.org/10.5751/ES-10651-230450>.
- Galudra G, van Noordwijk M, Agung P, Suyanto S and Pradhan U. 2014. Migrants, land markets and carbon emissions in Jambi, Indonesia: Land tenure change and the prospect of emission reduction. *Mitigation and Adaptation Strategies for Global Change* 19(6):715–731. <https://doi.org/10.1007/s11027-013-9512-9>.
- He J and Sikor T. 2015. Notions of justice in payments for ecosystem services: Insights from China's sloping land conversion program in Yunnan Province. *Land Use Policy* 43:207–216. <https://doi.org/10.1016/j.landusepol.2014.11.011>.
- Kennedy SF, Leimona B and Yi ZF. 2017. Making a green rubber stamp: Emerging dynamics of natural rubber eco-certification. *International Journal of Biodiversity Science, Ecosystem Services & Management* 13(1):100–115. <https://doi.org/10.1080/21513732.2016.1267664>.
- Khasanah NM, Tanika L, Pratama LDY, Leimona B, Prasetyo E, Marulani F, Hendriatna A, Zulkarnain MT, Toullet A and van Noordwijk M. 2021. Groundwater-extracting rice production in the Rejoso watershed (Indonesia) reducing urban water availability: Characterisation and intervention priorities. *Land* 10(6):586. <https://doi.org/10.3390/land10060586>.
- Kooiman J. 2010. Governance and governability. In Osborne SP. ed. *The new public governance? Emerging perspectives on the theory and practice of public governance*. London: Routledge, 88–102. <https://doi.org/10.4324/9780203861684>.
- Langston JD, McIntyre R, Falconer K, Sunderland T, Van Noordwijk M and Boedhihartono AK. 2019. Discourses mapped by Q-method show governance constraints motivate landscape approaches in Indonesia. *PLoS One* 14(1):p.e0211221. <https://doi.org/10.1371/journal.pone.0211221>.
- Leimona B and Carrasco LR. 2017. Auction winning, social dynamics and non-compliance in a payment for ecosystem services scheme in Indonesia. *Land Use Policy* 63:632–644. <https://doi.org/10.1016/j.landusepol.2015.10.022>.
- Leimona B, Khasanah N, Lusiana B, Amaruzaman S, Tanika L, Hairiah K, Suprayogo D, Pambudi S and Negoro FS. 2018. *A business case: Co-investing for ecosystem service provisions and local livelihoods in Rejoso Watershed*. Bogor, Indonesia: World Agroforestry (ICRAF) Southeast Asia Regional Program.

Leimona B, Lusiana B, van Noordwijk M, Mulyoutami E, Ekadinata A and Amaruzaman S. 2015a. Boundary work: Knowledge co-production for negotiating payment for watershed services in Indonesia. *Ecosystem Services* 15:45–62.

<https://doi.org/10.1016/j.ecoser.2015.07.002>.

Leimona B, McGrath FL and Khasanah NM. 2020. Sharing knowledge and value for nurturing socioecological production landscapes: A case of payment for ecosystem services in Rejoso Watershed, Indonesia. In Saito O. ed. *Sharing Ecosystem Services*. Singapore: Springer, 179–196. https://doi.org/10.1007/978-981-13-8067-9_9.

Leimona B, van Noordwijk M, De Groot R and Leemans R. 2015b. Fairly efficient, efficiently fair: Lessons from designing and testing payment schemes for ecosystem services in Asia. *Ecosystem Services* 12:16–28. <https://doi.org/10.1016/j.ecoser.2014.12.012>.

Leimona B, van Noordwijk M, Mithöfer D and Cerutti P. 2017. Environmentally and socially responsible global production and trade of timber and tree crop commodities: Certification as a transient issue-attention cycle response to ecological and social issues. *International Journal of Biodiversity Science, Ecosystem Services & Management* 13(1):497–502. <https://doi.org/10.1080/21513732.2018.1469596>.

Lescuyer G, Kakundika TM, Lubala IM, Ekyamba IS, Tsang R and Cerutti PO. 2019. Are community forests a viable model for the Democratic Republic of Congo? *Ecology and Society* 24(1):6. <https://doi.org/10.5751/ES-10672-240106>.

Martius C and Duchelle AE. 2021. REDD+: Combating climate change with forest science. FTA Highlights of a Decade 2011–2021 series. Highlight No. 11. Bogor, Indonesia: CGIAR Research Program on Forests, Trees and Agroforestry (FTA). <https://doi.org/10.17528/cifor/008221>.

Matrazzo SL. 2013. The democratic landscape: Envisioning democracy through Aldo Leopold's land ethic. Masters of Liberal Studies thesis. Paper 45. Winter Park, FL: Rollins College, Hamilton Holt School. <https://scholarship.rollins.edu/mls/45/>.

McCall MK and Minang PA. 2005. Assessing participatory GIS for community-based natural resource management: Claiming community forests in Cameroon. *Geographical Journal* 171(4):340–356. <https://doi.org/10.1111/j.1475-4959.2005.00173.x>.

Michael D and Chen S. 2005. *Serious Games: Games that Educate, Train and Inform*. Boston: Thomson Course Technology.

Minang PA. 2018. Values, incentives and ecosystem services in environmentalism. In Lele S, Brondizio ES, Byrne J, Mace G and Martinez-Alier J. eds. *Rethinking environmentalism: Linking justice, sustainability, and diversity*. Strüngmann Forum Reports, Vol. 23. Cambridge, MA: MIT Press.

<https://mitpress.mit.edu/books/rethinking-environmentalism>.

- Minang PA, Duguma L, Bernard F and Nzyoka J. 2017. *Transparent and accountable management of natural resources in developing countries: The case of forests*. Strasbourg, France: European Parliament, Directorate-General For External Policies, 72.
[https://www.europarl.europa.eu/RegData/etudes/STUD/2017/578045/IPOL_STU\(2017\)578045_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2017/578045/IPOL_STU(2017)578045_EN.pdf).
- Minang PA, Duguma LA, Bernard F, Foundjem-Tita D and Tchoundjeu Z. 2019. Evolution of community forestry in Cameroon. *Ecology and Society* 24(1).
<https://doi.org/10.5751/ES-10573-240101>.
- Minang PA, Duguma LA, van Noordwijk M, Prabhu R and Freeman OE. 2015. Enhancing multifunctionality through system improvement and landscape democracy processes: A synthesis. In Minang PA, van Noordwijk M, Freeman OE, Mbow C, de Leeuw J, Catacutan D. eds. *Climate-smart landscapes: Multifunctionality in practice*. Bogor, Indonesia: World Agroforestry (ICRAF), 389–405.
<https://doi.org/10.13140/2.1.5025.9529>.
- Minang PA, Duguma LA, van Noordwijk M, Sunderland T, Reed J, Leimona B, Ickowitz A, Wainaina P, Dewi S, Colas C, et al. 2021. *Multifunctional Landscapes for Sustainable Development*. FTA Highlights of a Decade 2011–2021 series. Highlight No. 13. Bogor, Indonesia: The CGIAR Research Program on Forests, Trees and Agroforestry (FTA).
<https://doi.org/10.17528/cifor/008223>.
- Minang PA, van Noordwijk M, Duguma LA, Alemagi D, Do TH, Bernard F, Agung P, Robiglio V, Catacutan D, Leimona B, et al. 2014. REDD+ Readiness progress across countries: Time for reconsideration. *Climate Policy* 14(6):685–708.
<https://doi.org/10.1080/14693062.2014.905822>.
- Mithöfer D, Roshetko JM, Donovan JA, Nathalie E, Robiglio V, Wau D, Sonwa DJ and Blare T. 2017a. Unpacking ‘sustainable’ cocoa: Do sustainability standards, development projects and policies address producer concerns in Indonesia, Cameroon and Peru? *International Journal of Biodiversity Science, Ecosystem Services & Management* 13(1):444–469.
<https://doi.org/10.1080/21513732.2018.1432691>.
- Mithöfer D, van Noordwijk M, Leimona B and Cerutti PO. 2017b. Certify and shift blame, or resolve issues? Environmentally and socially responsible global trade and production of timber and tree crops. *International Journal of Biodiversity Science, Ecosystem Services & Management* 13(1):72–85.
<https://doi.org/10.1080/21513732.2016.1238848>.
- Mulyoutami E, Lusiana B and van Noordwijk M. 2020. Gendered migration and agroforestry in Indonesia: Livelihoods, labor, know-how, networks. *Land* 9(12):529.
<https://doi.org/10.3390/land9120529>.
- Namirembe S, Leimona B, van Noordwijk M and Minang PA. 2017. *Co-investment in ecosystem services: Global lessons from payment and incentive schemes*. Nairobi: World Agroforestry (ICRAF). <https://www.worldagroforestry.org/publication/co-investment-ecosystem-services-global-lessons-payment-and-incentive-schemes-0>.

- Namirembe S, Leimona B, van Noordwijk M, Bernard F and Bacwayo KE. 2014. Co-investment paradigms as alternatives to payments for tree-based ecosystem services in Africa. *Current Opinion in Environmental Sustainability* 6:89–97. <https://doi.org/10.1016/j.cosust.2013.10.016>.
- Ngendakumana S, Minang PA, Feudjio M, Speelman S, Van Damme P and Tchoundjeu Z. 2014. Institutional dimensions of the developing REDD+ process in Cameroon. *Climate Policy* 14(6):769–787. <https://doi.org/10.1080/14693062.2014.877221>.
- Ostrom E. 1999. *Self-governance and forest resources*. Occasional Paper 20. Bogor, Indonesia: CIFOR. https://www.cifor.org/publications/pdf_files/OccPapers/OP-20.pdf.
- Ostrom E. 1990. *Governing the commons: The evolution of institutions for collective action*. Cambridge, UK: Cambridge University Press. <https://doi.org/10.1017/CBO9780511807763>.
- Pham TT, Castella JC, Lestrelin G, Mertz O, Le DN, Moeliono M, Nguyen TQ, Vu HT and Nguyen TD. 2015. Adapting free, prior, and informed consent (FPIC) to local contexts in REDD+: Lessons from three experiments in Vietnam. *Forests* 6(7):2405–2423. <https://doi.org/10.3390/f6072405>.
- Piabuo SM, Foundjem-Tita D and Minang PA. 2018. Community forest governance in Cameroon: A review. *Ecology and Society* 23(3):34. <https://doi.org/10.5751/ES-10330-230334>.
- Piabuo SM, Minang PA, Tieguhong CJ, Foundjem-Tita D and Nghobuoche F. 2021. Illegal logging, governance effectiveness and carbon dioxide emission in the timber-producing countries of Congo Basin and Asia. *Environment, Development and Sustainability* 1–21. <https://doi.org/10.1007/s10668-021-01257-8>.
- Purwanto E, Santoso H, Jelsma I, Widayati A, Nugroho HY and van Noordwijk M. 2020. Agroforestry as policy option for forest-zone oil palm production in indonesia. *Land* 9(12):531. <https://doi.org/10.3390/land9120531>.
- Robiglio V, Armas AD, Silva Aguad C and White D. 2014. Beyond REDD+ readiness: Land-use governance to reduce deforestation in Peru. *Climate Policy* 14(6):734–747. <https://doi.org/10.1080/14693062.2014.962467>.
- Sarmiento Barletti JP, Larson AM, Gomez Lavi X, O’Connell E and Thürer T. In press. *How are we doing? A tool to enable more equitable co-management in Peru’s protected areas*. Bogor, Indonesia: CIFOR-ICRAF.
- Sarmiento Barletti JP, Larson AM, Cisneros N, Heise N, Liswanti N, Mariño H and Tamara A. 2020. *How are we doing? A tool to reflect on the process, progress and priorities of your multistakeholder forum*. Bogor, Indonesia: CIFOR. <https://doi.org/10.17528/cifor/007796>.
- Savilaakso S, Cerutti PO, Montoya Zumaeta JG, Ruslandi Mendoula EE and Tsanga R. 2017. Timber certification as a catalyst for change in forest governance in Cameroon, Indonesia and Peru. *International Journal of Biodiversity Science, Ecosystem Services & Management* 13(1):116–133. <https://doi.org/10.1080/21513732.2016.1269134>.

- SERNANP (Servicio Nacional de Áreas Naturales Protegidas por el Estado). 2020. *Documento de trabajo n° 45: ¿Cómo vamos? Una herramienta para reflexionar sobre los procesos, los avances y las prioridades de nuestros Comités de Gestión de las Áreas Naturales Protegidas*. Lima: CIFOR and SERNANP. <https://www.cifor.org/knowledge/publication/7881/>.
- Singh VP, Sinha RB, Nayak D, Neufeldt H, van Noordwijk M and Rizvi J. 2016. *The national agroforestry policy of India: Experiential learning in development and delivery phases*. Working paper 240. Nairobi: World Agroforestry (ICRAF). <https://doi.org/10.5716/WP16143.PDF>.
- TAAS (Trust for Advancement of Agricultural Sciences). 2015. *Regional consultation on agroforestry: The way forward*. New Delhi: TAAS. <https://www.taas.in/documents/pub-activity-26.pdf>.
- Tacconi L. ed. 2007. *Illegal logging: Law enforcement, livelihoods and the timber trade*. New York: Earthscan. <https://www.cifor.org/knowledge/publication/2213/>.
- Thuy PT, Hong TTK, Nhan DTT, Hoa TNM, Anh NTT, Van Anh NT, Long HT, Phuong DH and Quang NN. 2021. Perceptions of wood-processing industries on FLEGT implementation: Insights from Vietnam. *Forest Policy and Economics* 132:102592. <https://doi.org/10.1016/j.forpol.2021.102592>.
- UNDP (United Nations Development Programme). 1997. *Defining core characteristics of good governance*. New York: United Nations Development Programme, Management Development and Governance Division.
- UNDP (United Nations Environment Programme). 2021. *Making peace with nature: A scientific blueprint to tackle the climate, biodiversity and pollution emergencies, Nairobi, 2021*. <https://www.unep.org/resources/making-peace-nature>.
- van Noordwijk M. 2021. Agroforestry-based ecosystem services: Reconciling values of humans and nature in sustainable development. *Land* 10(7):699. <https://doi.org/10.3390/land10070699>.
- van Noordwijk M. 2020. Prophets, profits, prove it: Social forestry under pressure. *One Earth* 2(5):394–397. <https://doi.org/10.1016/j.oneear.2020.05.008>.
- van Noordwijk M. ed. 2019. *Sustainable development through trees on farms: Agroforestry in its fifth decade*. Bogor, Indonesia: World Agroforestry (ICRAF). <http://worldagroforestry.org/downloads/Publications/PDFS/B19029.pdf>.
- van Noordwijk M. 2018. Integrated natural resource management as pathway to poverty reduction: Innovating practices, institutions and policies. *Agricultural Systems* 172:60–71. <https://doi.org/10.1016/j.agsy.2017.10.008>.
- van Noordwijk M and Brussaard L. 2014. Minimizing the ecological footprint of food: Closing yield and efficiency gaps simultaneously? *Current Opinion in Environmental Sustainability* 8:62–70. <https://doi.org/10.1016/j.cosust.2014.08.008>.

van Noordwijk M, Bagues-Tobella A, Muthuri CW, Gebrekirstos A, Maimbo M, Leimona B, Bayala J, Ma X, Lasco R, Xu J, et al. 2019. Agroforestry as part of nature-based water management. In Van Noordwijk M. ed. *Sustainable development through trees on farms: Agroforestry in its fifth decade*. Bogor, Indonesia: World Agroforestry (ICRAF), 305–334. <https://worldagroforestry.org/trees-on-farms>.

van Noordwijk M, Gitz V, Nasi N, Baral H, Belcher B, Boot R, Brady MA, Duchelle AE, Duguma LA, Elias M, et al. 2021. *Introduction: Ten Years of Forests, Trees and Agroforestry Research in Partnership for Sustainable Development*. FTA Highlights of a Decade 2011–2021 series. Highlight No. 1. Bogor, Indonesia: The CGIAR Research Program on Forests, Trees and Agroforestry (FTA). <https://doi.org/10.17528/cifor/008211>.

van Noordwijk M, Leimona B, Jindal R, Villamor GB, Vardhan M, Namirembe S, Catacutan D, Kerr J, Minang PA and Tomich TP. 2012. Payments for environmental services: Evolution toward efficient and fair incentives for multifunctional landscapes. *Annual Review of Environment and Resources* 37:389–420. <https://doi.org/10.1146/annurev-environ-042511-150526>.

van Noordwijk M, Lusiana B, Leimona B, Dewi S and Wulandari D. eds. 2013. Negotiation-support toolkit for learning landscapes. Bogor, Indonesia: World Agroforestry (ICRAF) Southeast Asia Regional Program. <http://worldagroforestry.org/downloads/Publications/PDFS/B17645.pdf>.

van Noordwijk M, Morris C, Gutierrez V, Cohen J, Sullivan CA, Verbist B and Muys B. 2015. *Ecological rainfall infrastructure: Investment in trees for sustainable development*. ASB-Policy Brief 47. Nairobi: World Agroforestry (ICRAF). <http://asb.cgiar.org/publication/ecological-rainfall-infrastructure-investment-trees-sustainable-development>.

van Noordwijk M, Namirembe S, Catacutan D, Williamson D and Gebrekirstos A. 2014. Pricing rainbow, green, blue and grey water: Tree cover and geopolitics of climatic teleconnections. *Current Opinion in Environmental Sustainability* 6:41–47. <https://doi.org/10.1016/j.cosust.2013.10.008>.

van Noordwijk M, Pacheco P, Slingerland M, Dewi S and Khasanah N. 2017a. *Palm oil expansion in tropical forest margins or sustainability of production? Focal issues of regulations and private standards*. Bogor, Indonesia: World Agroforestry (ICRAF). <https://doi.org/10.5716/WP17366.PDF>.

van Noordwijk M, Speelman E, Hofstede GJ, Farida A, Abdurrahim AY, Miccolis A, Hakim AL, Wamucii CN, Lagneaux E, Teuling AJ, et al. 2020. Sustainable agroforestry landscape management: Changing the game. *Land* 9(8):243. <https://doi.org/10.3390/land9080243>.

van Noordwijk M, Tanika L and Lusiana B. 2017b. Flood risk reduction and flow buffering as ecosystem services. Part 2: Land use and rainfall intensity effects in Southeast Asia. *Hydrology and Earth System Sciences* 21(5):2341–2360. <https://doi.org/10.5194/hess-21-2341-2017>.

Vatn A. 2007. *Institutions and the Environment*. Cheltenham, UK: Edward Elgar Publishing.

Villamor GB, van Noordwijk M, Djanibekov U, Chiong-Javier ME and Catacutan D. 2014. Gender differences in land-use decisions: Shaping multifunctional landscapes? *Current Opinion in Environmental Sustainability* 6:128–133. <https://doi.org/10.1016/j.cosust.2013.11.015>.

White D, Minang PA, Agus F, Borner J, Hairiah K, Gockowski J, Hyman G, Robiglia V, Swallow B, Velarde S, et al. 2011. *Estimating the opportunity costs of REDD+: A training manual*. Washington, DC: World Bank. <https://www.forestcarbonpartnership.org/redd-opportunity-costs-training-manual>.

Wunder S, Brouwer R, Engel S, Ezzine-de-Blas D, Muradian R, Pascual U and Pinto R. 2018. From principles to practice in paying for nature's services. *Nature Sustainability* 1(3):145–150. <https://doi.org/10.1038/s41893-018-0036-x>.

Zafra-Calvo N, Balvanera P, Pascual U, Merçon J, Martín-López B, van Noordwijk M, Mwampamba TH, Lele S, Speranza CI, Arias-Arévalo P, et al. 2020. Plural valuation of nature for equity and sustainability: Insights from the Global South. *Global Environmental Change* 63:102115. <https://doi.org/10.1016/j.gloenvcha.2020.102115>.

Zomer RJ, Neufeldt H, Xu J, Ahrends A, Bossio D, Trabucco A, van Noordwijk M and Wang M. 2016. Global tree cover and biomass carbon on agricultural land: The contribution of agroforestry to global and national carbon budgets. *Scientific Reports* 6(1):1–12. <https://doi.org/10.1038/srep29987>.

The FTA Highlights series

1. Introduction: Ten Years of Forests, Trees and Agroforestry Research in Partnership for Sustainable Development
2. Tree Seed and Seedling Systems for Resilience and Productivity
3. Conservation of Tree Biodiversity and Sustainable Forest Management
4. Forest and Landscape Restoration
5. Food Security and Nutrition
6. Wild Meat
7. Trees on Farms to Improve Livelihoods and the Environment
8. Biomass, Bioenergy and Biomaterials
9. Improving Rural Livelihoods through Supporting Local Innovation at Scale
10. Sustainable Value Chains, Finance and Investment in Forestry and Tree Commodities
11. REDD+: Combating Climate Change with Forest Science
12. Adaptation to Climate Change with Forests, Trees and Agroforestry
13. Multifunctional Landscapes for Sustainable Development
- 14. Governing Forests, Trees and Agroforestry for Delivering on the SDGs**
15. Advancing Gender Equality and Social Inclusion
16. Capacity Development
17. Monitoring, Evaluation, Learning and Impact Assessment
18. The Way Forward

This list represents the order of the volumes in the series and not the time sequence of publication.

Governing Forests, Trees and Agroforestry for Delivering on the SDGs

Over the last decade, the CGIAR Program on Forests, Trees and Agroforestry (FTA) has undertaken innovative basic and applied research across different scientific disciplines across the humid tropics in the area of enhancing the good governance of forests, trees and agroforestry, typically as part of landscapes that deliver on sustainable development goals. This publication presents key FTA outputs on forest and landscape governance from 2011 to 2021.



DOI: 10.17528/cifor/008224

This is No. 14 of the FTA Highlights of a Decade Series. Published volumes are indicated below. Other volumes forthcoming.

