SYNTHESIS REPORT

LEVERAGING AGRICULTURAL VALUE CHAINS

TO ENHANCE TROPICAL TREE COVER AND SLOW DEFORESTATION (LEAVES)

2018

PROFOR

INNOVATION AND ACTION FOR FORESTS

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GLOSSARY

Agricultural value chain: The sequence of producers, farmers, communities, and firms that produce, process, transport, and commercialize an agricultural commodity. The value chain encompasses all stakeholders participating in, influencing, or being influenced by the supply chain including government regulators, financial institutions, and technical advisory services.

Agroforestry parklands: Land-use systems in which woody perennials are deliberately preserved in association with crops and/or animals in a spatially dispersed arrangement and in which there is both ecological and economic interaction between the trees and other components of the system.

Corporate zero deforestation pledges: Corporate commitments to remove suppliers of agricultural commodities such as palm oil, soybean, beef, coffee, and cocoa whose activities results in deforestation.

Deforestation: The conversion of natural forest, woodland, or savanna to another form of land cover such as crop fields or livestock grazing land.

Deforestation cut-off dates: The date beyond which deforestation for commodity cultivation will result in rejection of the commodity by market players who are participating in a sourcing agreement or standard.

Illegal deforestation: Deforestation that is carried out despite regulations that prohibit it.

Jurisdictional approach: An approach to sustainable development in which the unit of performance is an entire political territory or geography such as a state, province, district, or county. The jurisdictional approach features a prominent role for governments and processes that bring the perspectives of several stakeholders to the task of defining a pathway to sustainable development in the territory.

Jurisdictional certification: The certification of all production of a commodity across an entire jurisdiction.

Jurisdictional REDD+: REDD+ mechanism (see below) in which the unit of performance is an entire territory or political geography such as a state, province, district, or county.

Net deforestation: The area of natural forest, woodland, or savanna deforested minus the area of newly regenerated or restored natural forest, woodland, or savanna.

REDD+: The Reductions in Emissions from Deforestation and Forest Degradation (plus forest carbon enhancement) program is a mechanism for compensating verified reductions in greenhouse gas emissions from deforestation and forest degradation endorsed by the United Nations Framework Convention on Climate Change.

Sustainability certification: A determination of the sustainability of an agricultural commodity according to a standard that is based upon principles and criteria usually developed through a multi-stakeholder process and usually focused on production practices.

ACRONYMS

BCA	Brazilian Cattle Agreement
BSM	Brazilian Soy Moratorium
CBA	Cocoa Butter Alternatives
GHG	Greenhouse Gases
GSA	Global Shea Alliance
LEAVES	Leveraging Agricultural Value Chains to Enhance Tropical Tree Cover and Slow Deforestation
NDPE	No Deforestation, No Peat, No Exploitation
NGOs	Nongovernmental Organizations
NTFP	Non-Timber Forest Product
PCI	Produce, Conserve, Include
PES	Payment for Environmental/Ecosystems Services
PROFOR	Program on Forests
REDD+	Reductions in Emissions from Deforestation and Forest Degradation (plus forest carbon enhancement)
RSPO	Roundtable on Sustainable Palm Oil
SPS	Silvopastoral Systems
WBG	World Bank Group
UNFCCC	United Nation Framework Convention on Climate Change

Oil Palm Plantations by Vaara/iStock

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EXECUTIVE SUMMARY

Slowing the degradation and clearing of tropical forests and increasing tree cover in agricultural and livestock grazing systems could become a critical part of the global solution to climate change. To realize this potential, improvements in crop and livestock yields must be achieved to reconcile the expansion of forest and tree cover with the growing global demand for food, feed, and fiber from the tropics.

The Leveraging Agricultural Value Chains to Enhance Tropical Tree Cover and Slow Deforestation (LEAVES) program, led by the World Bank Group and financed by the Program on Forests (PROFOR) has conducted agricultural commodity case studies involving beef, cocoa, coffee, oil palm, shea butter and soybean to identify key recommendations and lessons that can help the World Bank Group and others realize the potential of reducing deforestation and enhancing tree cover in agricultural landscapes. This Synthesis summarizes the key findings of these case studies.

The case studies point to both the positive impacts and the limitations of prevailing international strategies such as REDD+, voluntary certification of sustainably-produced agricultural and forestry commodities, corporate deforestation pledges, and payment for ecosystems / environmental[1] services. Not one of these mechanisms by itself can drive the forest-friendly and tree cover enhancement transformation in tropical production systems that is needed.

A new LEAVES paradigm focuses on tropical forest regions and the innovators among governments, farmers, villagers, researchers, nongovernmental organizations (NGOs), and agribusiness companies that are finding local solutions and opportunistically harnessing relevant international strategies and programs. This new paradigm is informed by the following six case studies.

CASE STUDY #1: Indonesia produces more than half of the world's palm oil and natural rainforest conversion to oil palm plantations has been a major cause of deforestation. The Bornean Province of Central Kalimantan has been a fertile testing ground for reconciling continued growth in palm oil production with forest conservation. District government heads have forged partnerships with some of the companies that buy palm oil as part of a jurisdictional certification pilot launched by the Roundtable for Sustainable Palm Oil (RSPO), an international sustainability standard. Systemic approaches to smallholder inclusion, land conflict, and eventually reduced deforestation are being sought through a collaborative, multi-stakeholder approach.

CASE STUDY #2: To meet growing global demand, the expansion of soybean cultivation has become a major driver of deforestation in South America. The Brazilian Soy Moratorium (BSM) helped to decouple this expansion from deforestation in the Amazon region, with agribusiness companies representing roughly 80 percent of the soy market committing to avoid soy produced on land cleared after July 2008. Additional policy-driven instruments that resulted in a 70 to 80 percent decline in the rate of deforestation in the Brazilian Amazon included a crack-down on illegal forest clearing, the expansion of the protected area network, and farmer and suspension of farmer access to public farm credit programs in high deforestation counties.

CASE STUDY #3: Beef production is the main driver of tropical deforestation in Latin America. In the Brazilian Amazon, after being prosecuted for buying cattle from illegal farms, major meat processing companies collaborated with international and local NGOs to create the Brazilian Cattle Agreement (BCA). The BCA committed participating companies to purchase cattle only from producers not engaged in deforestation, labor infractions, or illegal occupation of indigenous territories or protected areas. The BCA effectively involved processors in the challenge of slowing deforestation, but its effect has been restricted to their direct suppliers of cattle—about 20% of the total area of cattle pasture production.

CASE STUDY #4: Silvopastoral systems (SPS) for beef and dairy production, in which trees are incorporated into grazing lands, have been practiced in Latin America for several decades, as exemplified by Costa Rica. In addition to a certification strategy, the SPS case study shows other complementary technical solutions to tackling deforestation related to beef production. SPS demonstrates a practical way to intensify cattle production while retaining and enhancing trees in pasturelands. Government incentives for reforestation helped to drive beef and dairy yield increases on a shrinking area of pastureland. When tailored to local soils, climate, and social conditions, SPS can increase yields and resilience to climate and economic shocks while reducing greenhouse gas emissions. Innovative partnerships between government agencies, academia and farmer organizations have helped drive innovation.

1 "Environmental services" and "ecosystem services" are used interchangeably in this report.

CASE STUDY #5: Coffee and cocoa are drivers of both deforestation and reforestation. To decouple deforestation from crop expansion, private companies are committed to zero deforestation supply chains. A good example is the recently launched Cocoa and Forest Initiative, which was signed by 22 major cocoa companies and the governments of Cote d'Ivoire and Ghana, the two largest world cocoa producers. In Central America and Africa, coffee and cocoa are typically cultivated under a tree shade canopy. However, the use of shade is decreasing due to crop husbandry intensification to achieve higher crop yields. The common wisdom is that low shade or no-shade systems are winning the productivity battle, a misconception that must be changed. The productivity, profitability, and resilience of shaded coffee and cocoa must be improved to: a) stimulate the retention of shade trees while increasing crop yields, b) avoid clearing shaded coffee and cocoa to plant herbaceous crops and pastures, and c) stimulate coffee and cocoa agroforestry systems to replace un-productive herbaceous crops and degraded pastures. Sound design and management of the agroecosystem, and improved value chain of tree products are key to increase profitability and resilience.

CASE STUDY #6: Shea agroforestry parklands of sub-Saharan Africa contribute to the food security of over 200 million people across 300-350 million hectares (ha) semi-arid zone that borders the southern margin of the Sahara Desert and stretches from Senegal in the west to Uganda in the east. Locally, shea butter is an important edible oil. These roles for shea butter have been overshadowed by the exported portion of shea production destined for luxury cosmetics and confectionary. Contrary to widespread perceptions that shea is slow-growing and difficult to manage, shea is a fast-growing pioneer tree species that thrives in traditional rotational farm-fallow mosaics. It is being lost due to land use conversion, mechanized agriculture, reduced fallow periods, and urban expansion. The cleared trees are then used for fuelwood. Shea tree density is declining rapidly in the remaining parklands as are the associated pioneer species that are critically important habitats for pollinators of shea flowers. To reverse this trend, improvements in research, awareness, policy, and village-level, female-oriented technological advances are needed. Public perceptions must also shift to view shea as a potentially valuable commodity managed as a component of a sustainable agroforestry system that underpins the livelihoods of increasingly vulnerable communities that can be displaced and forced to migrate.

BACKGROUND

Agriculture is the primary source of food for the world's rapidly growing population. It is also the largest driver of

tropical deforestation and forest degradation. Fortunately, agricultural value chains can play a significant, positive role in protecting and enhancing tropical tree cover. For agriculture to be part of the solution for deforestation and degradation, agricultural stakeholders will need to profoundly transform agricultural value chains such as beef, soy, and palm oil that are disproportionately driving tropical forest loss and forest degradation, as well as transform agricultural value chains for commodities such as coffee, cocoa, and shea butter that come from trees. Recognizing the role that agricultural commodity value chains can play in sustaining tropical forests and tree cover, the Program on Forests (PROFOR) at the World Bank Group (WBG) funded a forest-smart knowledge product entitled Leveraging Agricultural Value Chains to Enhance Tropical Tree Cover and Slow Deforestation (LEAVES).[2]

The LEAVES knowledge product identifies, explores, and synthesizes a practical understanding of how agricultural value chains can be part of the solution to deforestation and degradation. It aligns with the WBG Forest Action Plan FY16-20, which aims to integrate the sustainable management of forests more fully into development decisions through two investment channels. The first channel includes sustainable forestry investments that contribute to the sustainable management of forests and value chains. The second channel includes forest-smart interventions in other sectors that do not come at the expense of forest capital. Conserving and restoring forests feature prominently in the Sustainable Development Goals set by the United Nations and form an integral part of climate and development agendas at the national and global levels.

The LEAVES study serves as an expertise-building and knowledge-brokering resource for WBG task leaders, government officials, and agricultural value chain stakeholders at large. The study will help avail stakeholders of the latest operational knowledge they need to identify, evaluate, scale up, and scale out successful approaches that leverage agricultural value chains to protect and enhance tree cover in tropical forest countries. The study also actively seeks to enhance learning across geographical regions and across commodities. Jointly led by the World Bank Food and Agriculture Global Practice and the Environment and Natural Resources Global Practice, the study demonstrates that the scope and opportunities to address the challenges to conserving and restoring forests are vast. An integrated, landscape-based approach is key to successful outcomes for tropical forests and tree cover. The study benefits from contributions from the International Finance Corporation, partner development agencies, nongovernmental organizations (NGOs), and seasoned global commodity experts, who were commissioned to author this report.[3]

The LEAVES knowledge product complements other like-minded initiatives by focusing on the role of the public sector in supporting promising, private sector-led approaches. The study's approach recognizes that public sector policies and programs have a critical role to play even in those instances where the private sector is driving development. The LEAVES study provides significant value added by examining both those agricultural commodities that have been driving tropical deforestation, as well as those commodities that potentially conserve and enhance tree cover in landscapes.

INTRODUCTION

Global demand for food, fuel, and fiber is growing rapidly as hundreds of millions of people in emerging economies rise out of poverty and consume more animal protein, oil, and carbohydrates.[4] Global food demand is projected to rise by an estimated 45%, in dollar terms, between 2010 and 2050 (FAO 2012), which will cause formidable new stresses on the natural and social systems of agrarian landscapes. The required increase in food production is made even more daunting by a climate that is increasingly unpredictable and extreme.

Most of the needed growth in agricultural production is likely to come from the tropical and subtropical latitudes where the potential for expanding cultivation and increasing yields is the greatest. Herein lies a critical challenge: much of that potential expansion implies conversion of forests, woodlands, grassland, and wetlands to cropland and pasture (Gibbs et al. 2010).

Forest, woodland, grassland, and wetland ecosystems are a potentially large component of the global solution to climate change. Slowing tropical forest degradation and forest conversion to agriculture and livestock production systems, combined with rapid forest recovery, could deliver more than one fourth of the greenhouse gas emissions reductions that will be needed to avoid a dangerous two-degree warming worldwide (Griscom et al. 2017). The recovery of forests, woodlands, and grasslands is the only large-scale carbon capture and storage system that is currently operating in the world.

Natural ecosystems also provide life-sustaining services, food, and incomes to local communities. For example, natural

2 "Forest-smart" is a development approach that recognizes forests' significance for sustaining growth across many sectors including agriculture, energy, infrastructure, and water. The forest-smart approach transforms how sectors operate by identifying opportunities for mutual benefit and by creating practical solutions that can be implemented at scale. Forest-smart solutions support development outcomes and impact such as improved food security, green growth, and climate change mitigation and adaptation.

3 Daniel Nepstad (Executive Director, Earth Innovation Institute—soy); Peter Lovett (Shea Parklands Specialist—shea); Silvia Irawan (INOBU—palm oil); John Watts, (INOBU—palm oil); Danilo Pezo (Advisor, Tropical Agricultural Research and Education Center—CATIE—silvopastoral Systems); Eduardo Sommariba (Lead, Agroforestry and Sustainable Agriculture Program, CATIE—Cocoa-coffee); and Joao Shimada (Research Associate, Earth Innovation Institute—Beef).

4 Consumption levels per capita are still far lower in emerging economies than in industrialized ones.

ecosystems stabilize and moderate local and regional climate and flood regimes, recharge aquifers, regulate stream flows, sustain soil fertility, provide sellable commodities, strengthen food and income security, and sustain biodiversity including vital species groups, such as pollinators.

The global demand for soybeans and palm oil has come at the expense of tropical forests and savannas. Signs of a slowdown in the rate of increase in global demand could help to decelerate the rates of tropical deforestation, particularly in Brazil and Indonesia (Byerlee 2018). If accompanied by revised strategies for slowing tropical deforestation and enhancing tree cover in crop and livestock production systems, this slowdown in demand could help reverse the "more-food-equals-less-forests" trend of the past, as well as increase the chances of maintaining the global climate system below the dangerous two-degree Celsius warming.

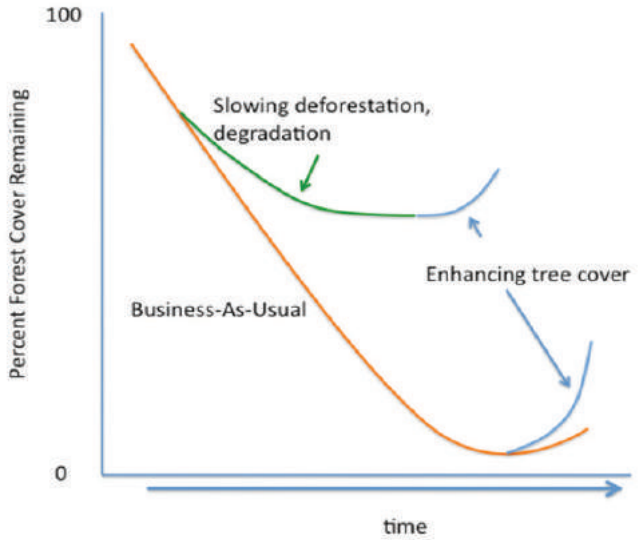
The LEAVES study analyzes some of the world's leading experiments for avoiding the business-as-usual pathways to greater food production through which cropping and livestock systems replace forests, woodlands, and parklands. The study hopes to answer the question: *how do we decouple agricultural expansion and deforestation and bring trees back into production systems?*

The goal of these six, expert-authored case studies is to derive lessons from agricultural value chains and tree-based production systems to inform the WBG's programs and priorities. These case studies are also intended to inform the global community on how best to harness the power of trees and tropical forests as a global solution to the intertwined challenges of food production, climate change, and rural livelihoods. The study does this through case studies of beef, soy, and palm oil as the three global value chains driving deforestation and degradation. The final three case studies on tree-cattle (silvopasture), cocoa/coffee, and shea tree-based systems focus on enhanced tree cover in landscapes.

CONCEPTUALIZING THE CHALLENGE: BENDING THE FOREST TRANSITION CURVE

Most nations go through a forest transition period in which natural forests are depleted of their timber and cleared to make room for agricultural and livestock expansion. Once forests have been mostly depleted or replaced, forest cover typically undergoes a partial rebound as natural forests regenerate on lands with low agricultural productivity or as tree plantations are established (Rudel et al. 2005). The LEAVES report is based on the premise that the shape of the business-as-usual forest transition curve is not inevitable (see Figure 1).

FIGURE 1. LEAVES: BENDING THE FOREST TRANSITION CURVE



First, the downward slope of the business-as-usual curve shows the depletion of forests and woodlands over time that can reach an inflection point before forests are completely depleted. As an example, the LEAVES study examines how deforestation has slowed sharply in the Brazilian Amazon region even though nearly 80% of the forest is still standing.[5] Similar success is within reach in Borneo, Indonesia and many other tropical forest regions.

Second, the enhancement of tree cover can be accelerated by bringing trees into agricultural and grazing production systems as illustrated by shade-based coffee/cocoa production and silvopastoral production systems across Latin America with examples and inferences for Africa and East Asia. The restoration of tree cover can also be accomplished by conserving and restoring regional woodlands and community-managed parklands as in the case of shea butter production.

The LEAVES report uses three case studies on palm oil, soy, and beef value chains and three studies on cocoa/coffee production, shea butter production, and silvopastoral systems to extract key lessons in how to bend the business-as-usual forest transition curve upward by ending deforestation well before forests are depleted and by accelerating the establishment of tree cover in production systems.

SYNTHESIS: TOWARDS A NEW PARADIGM

The global community concerned with sustainable rural development in the tropics is at an important inflection point. The approaches that have been tested over the last few decades—sustainability certification for international

5 https://www.scientificamerican.com/article/deforestation-ticks-up-in-brazils-savannah/

standards, payment for environmental services (PES), REDD+, government command-and-control regulation, and corporate zero deforestation pledges—have all made important, positive contributions to the broader goal of reconciling increases in agricultural and livestock production with environmental conservation and social inclusion. However, no single approach has emerged as capable of driving change at the scale and speed that is necessary. The LEAVES study reminds readers that there is no silver bullet solution. The case studies presented in this knowledge product help shape and make clear a new paradigm for achieving sustainable development in the tropics. This paradigm draws on the strengths of the major innovations of recent decades while finding ways to address the weaknesses.

What are the key elements of this new paradigm?

First and foremost, the new paradigm must find ways of making sustainability competitive. The farmers, communities, companies, and governmental leaders who are finding ways to keep or recover forests while expanding agricultural production and improving livelihoods are all too often fighting against great odds. The playing field is still tilted against them. A clear message is urgently needed that sustainability innovators will be recognized, rewarded, and ultimately become more competitive than their peers who do not choose the pathway of sustainable development. Positive incentives must favor sustainable practices, forest maintenance, and enhanced tree cover; Negative incentives must discourage forest- and tree-destroying practices.

The new paradigm means tapping into the power of those who are finding ways of expanding production without destroying forests, and enhancing tree cover in their production systems. The fundamental shift toward empowering innovators requires definitions of success that are flexible enough to represent local perspectives on the pathway to sustainable development without losing the rigor and credibility of international sustainability standards achieved through multi-stakeholder consensus. This means defining success in a way that is not black or white, sustainable or not sustainable. Rather, the agricultural community needs definitions of success that resonate with local leaders and that can be reliably measured. Success begins with the current state of affairs on the ground and measures progress from that baseline.

Despite the many innovations in value chain approaches, the end game continues to embed the goals and principles of forest maintenance and enhanced tree cover into the public policies and programs that shape land-user behavior. Governments would be more inclined to do their part when the new definition of success—including success in keeping and restoring forests and tree cover—is widely accepted by local and international stakeholders. Restrictive land-use regulations to discourage forest-destroying development can be complemented by fiscal and other incentives that reward innovators who are advancing forest-maintaining and tree-enhancing production systems.

The new paradigm will depend upon a proliferation of partnerships for change. Partnerships may include companies collaborating with local farm sectors, communities collaborating with governments, and investors including active tropical deforestation frontiers into their portfolios. The new paradigm will see the REDD+ concept of pay-for-performance incentive systems applied in new and creative ways that foster collective action on the ground to achieve regional success.

The subsequent two chapters outline the six commodity case studies and the cross-cutting lessons and policy messages that informed the new paradigm shift.

CASE STUDIES

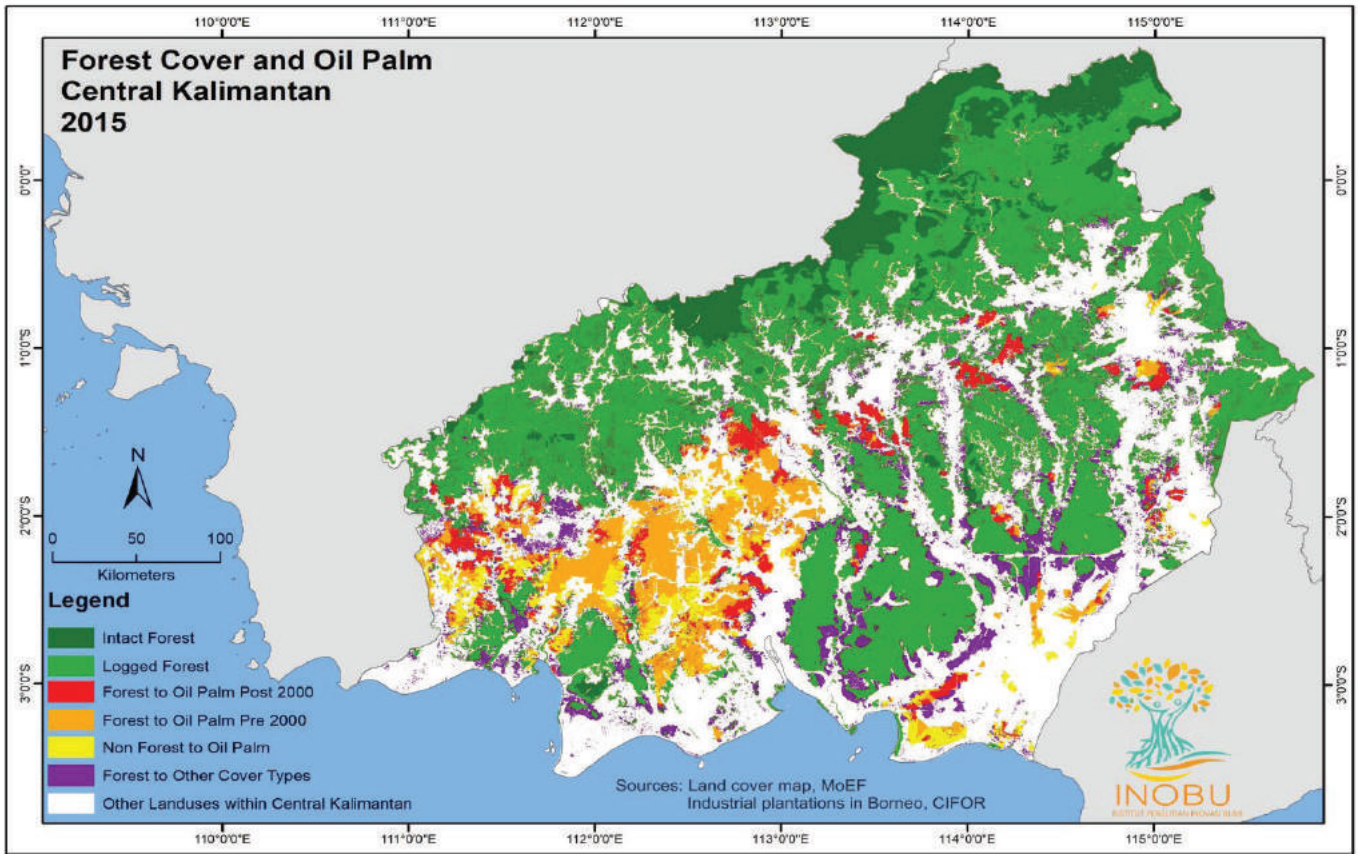
CASE STUDY #1
Oil Palm in Indonesia—the Limits of Certification and Zero Deforestation Pledges

The expansion of oil palm plantations in Indonesia has been driven by a significant increase in demand for oil crops. From 1990 through 2010, the world production of palm oil grew three-fold. In the late twentieth century, Indonesia's rapid expansion in oil crop production led it to become the world's largest producer of palm oil followed by Malaysia (Byerlee et al. 2016). Indonesia's experience offers lessons that could be adapted for both smallholder and large-scale palm oil producers in Africa and Latin America.

The relationship between oil palm expansion and deforestation is nuanced. Oil palm plantations are not the primary drivers of deforestation in Indonesia as they are generally planted in areas that have already been degraded. However, this use of degraded land prevents forests and peatland from rejuvenating or from being properly restored. The acquisition of land for oil palm plantations has in the past led to conflicts with local communities.

The provincial and district governments of Central Kalimantan in Indonesia have been engaged in one of the world's most advanced experiments in how best to shift palm oil production towards a more sustainable pathway. Since 2003, the economy of Central Kalimantan has grown rapidly.

FIGURE 2. FOREST COVER IN 2015 AND HISTORICAL LAND USE INCLUDING OIL PALM CHANGE IN CENTRAL KALIMANTAN, INDONESIA



Source: Ministry of Environment and Forestry (deforestation data), CIFOR's industrial plantations data, map by INOBU
**Although the immediate cause of deforestation is usually clearing and degradation for timber and pulp, oil palm plantations have now been established on most cleared land.*

This growth has been driven largely by commercial land uses, particularly for oil palm, with the number of plantation companies tripling (Figure 2).

In 2010, Central Kalimantan was selected as a pilot province as part of Indonesia's efforts to implement its *Reducing Emissions from Deforestation and Degradation* strategy. A provincial regulation on sustainable plantations (Perda 5/2011) was issued in 2011. This regulation provided a regulatory framework for environmental management and community plantations, mandated recognition and respect for indigenous rights, and gave assurances that new plantations were only allocated on lands that had been already deforested or degraded.

The first major step in implementing a jurisdictional approach in Central Kalimantan was the development of *The Central Kalimantan Roadmap to Low-deforestation Rural Development that Increases Production and Reduces Poverty* in June 2013. In 2014, the district government of Kotawaringin Barat, supported by the provincial government of Central Kalimantan and the Ministry of Agriculture, launched a program to map all independent smallholder oil palm farmers in the district. Mapping and registering independent smallholders was the first step in supporting smallholders to farm legally, sustainably, and productively. These farmers will be supported through a district public-private agricultural facility that was established in 2018. The facility will provide training and agricultural inputs to independent smallholders in the district to address the yield gap between smallholders and large-scale producers. This roadmap has been replicated in other districts in the province. A plantation monitoring system, SIPKEBUN, was launched in 2016 and will be expanded to include a traceability mechanism for smallholder supply chains.

An important linkage between these governmental initiatives and the growing corporate demand for *No Deforestation, No Peat, No Exploitation* (NDPE) palm oil was established through the promotion of jurisdictional certification. In 2015, the Roundtable on Sustainable Palm Oil (RSPO) approved pilot initiatives for jurisdictional certification in the district of Seruyan in Central Kalimantan as well as the State of Sabah, Malaysia. The district of Kotawaringin Barat followed shortly after and the district of Gunung Mas in Central Kalimantan is also making steps towards jurisdictional certification. Driving jurisdictional certification in each of these districts is a multi-stakeholder working group convened by local government decree. These working groups are charged with establishing district-wide sustainable development targets. Unilever, an international conglomerate, has partnered with the Government of Kotawaringin Barat to fulfill its NDPE pledge. Dialogues are underway in these districts to build upon the RSPO jurisdictional certification to achieve jurisdiction-wide sustainability and pathways to net zero deforestation regionally. Net zero deforestation, in which the area of forest cleared is balanced by the area of new, species-rich forest, is much more palatable to local governments and farm sectors than zero deforestation.

The pathway to jurisdictional certification has also incentivized the Indonesian government to revise its spatial plan to reduce deforestation and peatland degradation as well as to protect and restore wildlife corridors and riparian areas. The government has begun paying greater attention to the legal compliance of plantation companies to ensure that they are meeting their requirements of allocating 20% of their concessions to smallholders. The government is currently in the process of piloting instruments for mediating social conflicts from plantation expansion and regulating the land tenure of farmers in forest areas.

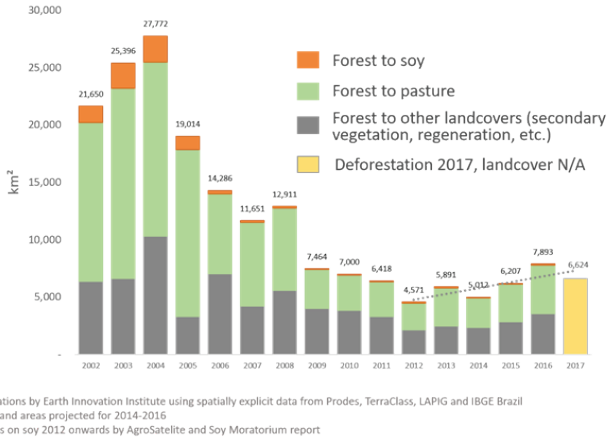
Have these initiatives worked?

Although these initiatives are still nascent, they are incentivizing local governments to address many of the governance issues that currently impede the achievement of sustainable and inclusive palm oil production. Governance reforms are notoriously slow to demonstrate change. Only over time will we know whether these reforms translate into measurable declines in deforestation, peatland degradation, and fires. Because of the distribution of authority in Indonesia, district governments only have the authority to address deforestation and degradation in areas outside of state-owned forests. To avoid the further cycle of deforestation and forest degradation followed by rezoning for agricultural purposes, district governments should coordinate with provincial governments to reduce deforestation and degradation in state-owned forests located within their district boundaries.

CASE STUDY #2
Soybeans in the Brazilian Amazon and the Case of the Brazilian Soy Moratorium

As the source of vegetable protein of choice in animal feed, the growth in global demand for soybeans is closely linked to increases in meat consumption in emerging economies led by China. For example, in 2017, China, which imports 60% of the soybeans traded worldwide, bought 51 million tons from Brazil, accounting for 53% of total purchases. Soybean imports from Brazil to China are expected to keep growing in part because of retaliatory tariffs China has imposed on US soybean imports and the relatively higher protein content of Brazilian soy. Much of the expansion in soybean cultivation is taking place in natural forests and woodland ecosystems in the tropical and subtropical latitudes. These ecosystems include the Amazon rainforest, the Cerrado woodland savanna, and the Chaco regions of Paraguay and Argentina. However, in the Amazon region of Brazil, 99% of all soybean expansion is decoupled from Amazonian deforestation (Figure 3). Why and how did this happen?

FIGURE 3: ANNUAL DEFORESTATION IN THE BRAZILIAN AMAZON BY CAUSE: SOY, PASTURE, AND OTHER LAND COVER



Source: Nepstad and Shimada (2018) with Juan Adrila, Earth Innovation Institute

The Brazilian Soy Moratorium (BSM), an agreement between NGOs and companies that buy 80-90% of the Brazilian Amazon soy crop, holds part of the answer to this question. Through the BSM, companies have agreed not to buy soybeans cultivated on land that has been deforested after July 2008.

Has the BSM worked?

From the perspective of corporate risk management, BSM has worked very well. The entire soybean crop of the Brazilian Amazon is virtually deforestation free. From the perspective of regional deforestation trends, however, BSM's impact has been much more modest. The 70% decline in annual deforestation rates in the Brazilian Amazon region was achieved largely through a governmental crack-down on illegal activities, a massive expansion of the area of forest under legal protection, and a suspension of public credit programs for farmers in high-deforestation *municipios* (Nepstad et al. 2014).

The favorable agronomic, regulatory, and monitoring ingredients that have been critical to BSM's success may be difficult to find or replicate in other regions of the world. Most of the Amazon is too wet for soybean cultivation. In addition, where the rainfall and soils are suitable, Amazon soybean farmers do not need to clear additional forests to expand their production. There are still plenty of flat, well-drained cattle pastures that are suitable. And with an 80% minimum forest requirement imposed upon every Amazon farm through the Brazilian Forest Code, most farmers have little if any forest on their properties that they can legally clear.

Scholars have identified the following key factors that contribute to BSM's success as a value chain intervention including (a) a limited number of soy buyers that exert considerable control over soy purchase and finance, (b) simple requirements for compliance, (c) streamlined and transparent monitoring and enforcement systems, (d) complementary efforts by the Brazilian government to reduce deforestation, and (e) active collaboration by NGOs and government agencies (Gibbs et al. 2015).[6] Monitoring and compliance mechanisms established by BSM are a model for expanding supply-chain governance to other soy-producing regions and commodities.

These interpretations of the BSM raise a critical question, however. Is the cost of implementing a value chain intervention, such as the BSM, the best use of scarce human and financial resources? Would the convening of NGOs and companies, the considerable effort of tracking the deforestation history of individual soy fields, and other investments in the governance of the Amazon soybean value chain be better applied to wall-to-wall strategies that focus on regional solutions to deforestation, productivity, and social inclusion? This question is particularly relevant given the possible perverse incentive for meat producers to shift their deforestation to other forest frontiers as they sell their pastureland to soybean cultivators (Nepstad et al. 2006).

The effectiveness of BSM and similar agreements under consideration elsewhere could be increased through a stronger link with the public policies already in place to regulate deforestation on private landholdings. For example, jurisdictional approaches to tropical deforestation are designed to achieve this integration as they increase agricultural production while reducing deforestation and helping smallholders increase their productivity and incomes. Mato Grosso's *Produce, Conserve, and Include* policy is one example of a jurisdictional strategy.

Farmer participation in negotiations is essential to the long-term sustainability of sourcing agreements. A major sustainable soy sourcing agreement under discussion between the Brazilian soy sector and the EU's biggest soy importer—the Animal Feed Federation (FEFAC)—is the most prominent example of a value chain process that includes farmers at the negotiation table.

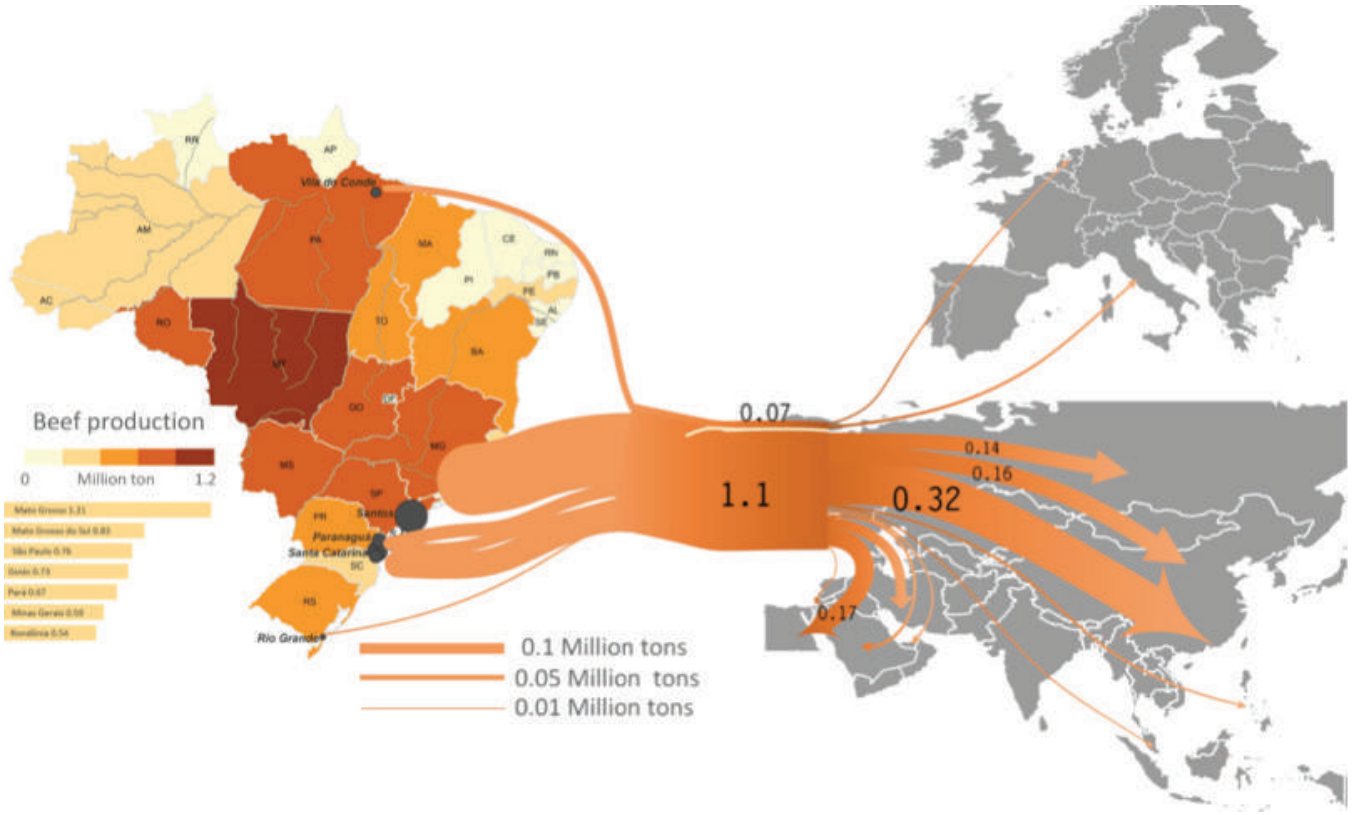
CASE STUDY #3
Beef in the Brazilian Amazon

Brazil is the world's second largest producer of beef and the largest source for China's growing beef imports. Eighty percent of Brazilian beef production is destined for domestic markets (Figure 4), where the demand for sustainably-produced beef is still quite weak. This is particularly important given the prevalence of cattle pasture as a driver of deforestation.

The Brazilian Cattle Agreement (BCA) is, in this regard, a very important experiment in moving the cattle sector towards sustainability. The initial impetus for the agreement was legal action taken by the Brazilian Public Prosecutor's Office in

6 http://science.sciencemag.org/content/sci/347/6220/377.full.pdf?sid=44327b90-2737-4de1-bb36-2ada6c435626

FIGURE 4. **BRAZILIAN BEEF PRODUCTION AND EXPORTS IN 2016**



Source: Earth Innovation Institute with data from IBGE and SECEX, Brazil; Shimada and Nepstad (2018) with Juan Ardila

the State of Pará. This legal action forced beef processors to obey the law and source cattle only from ranches that were not engaged in illegal deforestation or labor practices. Hoping to avoid similar legal action in other states and encouraged by the Greenpeace *Slaughtering the Amazon* report, the four largest beef processing companies pledged to immediately suspend the purchase of cattle from those farms that engaged in deforestation after 2009, encroached on protected areas or indigenous territories, and engaged in slave labor.

Has the BCA worked?

Although BCA contributed to an unprecedented 70% reduction of deforestation in the Brazilian Amazon, its contribution was modest. BCA reduced deforestation on the ranches that sold cattle directly to the participating meat processors, although cattle *laundering*—moving cattle from non-compliant ranches to compliant ranches prior to sale—was also detected. Farms and ranches that did not sell directly to meat processors were not affected by BCA. Examples of non-participating farms include calving/breeding operations, those farms who sold to clandestine meat processors, and those farms whose cattle pastures were established for land speculation rather than for meat production purposes. The BCA was enforced by the processors themselves and abuses in monitoring were noted. In 2017, a government operation titled *Carne Fria* found that JBS, Brazil's largest meat processor and a founding participant in the BCA, had purchased cattle from farms engaged in illegal deforestation. Greenpeace left the BCA shortly thereafter, although the agreement itself continues to this day.

The Brazilian Amazon cattle sector is poised to complete the transition to low or eventually zero deforestation through positive incentives for producers who are investing in legal compliance with the Forest Code and sustainable improvements in productivity. Success will depend upon effective public policies to prevent the conversion of forest land with low potential for farming and livestock production to cattle pastures, driven by land speculation. These important steps are part of the Mato Grosso *Produce, Conserve, Include* (PCI) strategy. BCA, like many supply chain strategies for achieving zero deforestation, imposes restrictions and penalties on producers while providing few positive incentives. The shortage of "carrots" for conservation-minded and responsible producers may be contributing to the polarization of the powerful farm lobby in Brazil. A fundamental issue raised by both the BSM and the BCA is the long-term effectiveness of strategies that rely almost exclusively on punitive or restrictive measures. Despite previous declines, deforestation in the Brazilian Amazon has been rising in recent years (Figure 3).

Cattle Drive in Mato Grasso, Brazil by SECOM-MT

Suspected causes include a combination of cuts in law enforcement budgets and frustration with the lack of recognition and positive incentives for those farmers and companies who are making the transition to sustainable production systems.

Recently, investors and corporates stepped up calls for zero deforestation via a joint statement calling for a renewed effort to bring an end to deforestation in Brazil's Cerrado region, where almost half the forest cover has already been cleared to enable agricultural expansion designed to meet booming global demand for commodities such as soy and beef.

In general, strategies for controlling deforestation must be revised to feature a more positive approach. Such approaches can provide positive incentives to top performers while maintaining punitive disincentives such as the BCA. Suffice to add that the many promising lessons from silvopastoral cattle approaches in Latin America can inform incentives to increase tree cover in pastures to fight deforestation in Brazil as shown in Case Study #4.

CASE STUDY #4
Silvopastoral Systems for Intensifying Cattle Production and Enhancing Forest Cover: The Case of Costa Rica

In the last 50 years, the demand for meat and dairy products has increased significantly in Latin America and globally. The immediate outcome has been a dramatic increase in livestock populations and pasture land often at the expense of natural forests. In the early 1980s, attention was drawn to the linkage between the expansion of pastures and the loss of tropical forests via the so-called "hamburger connection," which established a link between growing international demand for beef and increasing deforestation in less developed countries,[7] culminating in the banning of Costa Rican beef imports by one of the largest buyers in the USA.

Also in the late 1980s, the Costa Rican government put in place both regulatory and incentive schemes to reward natural forests protection and reforestation in areas considered a priority for public policy objectives such as watershed protection and biodiversity conservation. This scheme triggered not only a reduction in deforestation, but also a reduction in the total area under pastures. Despite these changes, starting in the 1990s, total beef production declined only slightly whereas milk production increased significantly. The latter can be explained in part because many beef farmers moved to dual-purpose (dairy-beef) cattle systems because of the greater demand and better prices for milk products in local and regional markets. As a large proportion of the lands included in reforestation programs were located on livestock farms, incentives were used to rehabilitate degraded pastures, to intensify

7 https://www.researchgate.net/publication/263011651_Hamburger_Connection_Fuels_Amazon_Destruction_Cattle_Ranching_and_Deforestation_in_Brazil%27s_Amazon

pasture management in reclaimed lands, and to implement silvopastoral (SP) technologies. The SP components included legume fodder banks, woody perennials in alley farming with pasture grasses, multi-strata live fences with timber trees, scattered multipurpose trees in pastures, grazing under tree plantations, windbreaks, woody perennials in contour farming, and the protection/restoration of riparian forest.

Have these policies worked?

A key outcome of these new policies has been a better understanding by farmers and ranchers of the benefits of SP systems. The implementation and proper management of well-designed SP systems that are adapted to prevailing agroecological conditions not only increases livestock productivity, diversifies income, and enhances production system resilience, but also reduces deforestation, mitigates GHG emissions, and increases above- and below-ground carbon sequestration in a region that is highly vulnerable to climate change. A key factor for successfully implementing SP innovations is to customize them to local agroecological conditions, landscape locations, and land use systems.

Another intervention that may have contributed to successful scaling up of SP adoption, especially in Costa Rica, has been the establishment of a payment for environmental services (PES) scheme. More recently, the implementation of the *National Strategy for Low-Carbon Emissions in the Livestock Sector*, promoted jointly by the Costa Rican Ministry of Agriculture & Livestock and Ministry of Environment & Energy, has improved extension and technical assistance services for the livestock sector. Public-private partnerships between government research, development institutions, academia, and farmer associations have also contributed to success. Currently, the approach that started in 2015 involves testing and monitoring innovations in 350 dairy, dual-purpose, and beef cattle farms across the country. The goal is to cover 70% of the national herd and 60% of the land under livestock use by 2030. To scale up these efforts, livestock sector stakeholders are targeting special funds available through different global climate change initiatives, such as the Green Climate Fund, the 20x20 Initiative, and REDD+ as well as national funds.

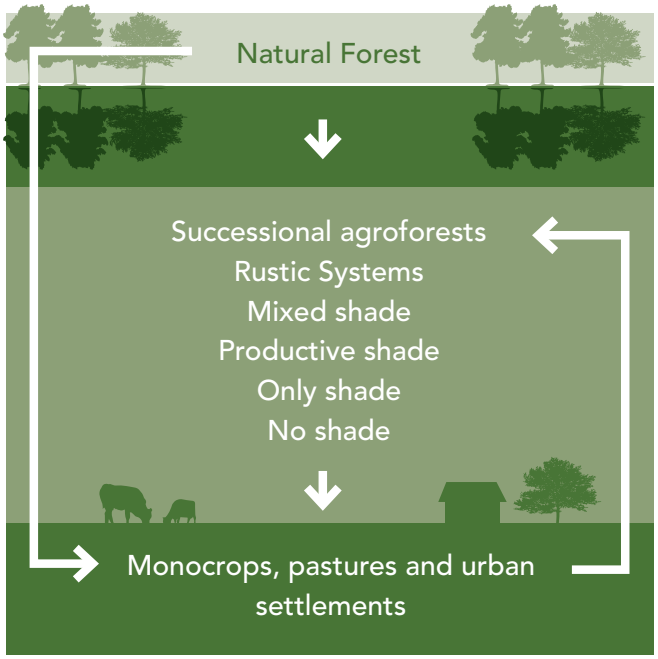
CASE STUDY #5
Coffee and Cocoa Agroforestry Systems: Pathways to Deforestation, Reforestation, and Tree Cover Change

Globally, coffee cultivation covers 11 million hectares (ha) and involves 10 million farmers producing 9.22 million tons of green coffee annually and influences the livelihood of some 125 million people. Similarly, cocoa cultivation covers 10.2 million ha, involves 10 million cocoa farmers producing 4.47 million tons annually, and influences the livelihood of some 40-50 million people.

Coffee and cocoa are typically grown under shade, e.g. in agroforestry systems; globally 48% of coffee and 31% of cocoa respectively are cultivated under shade. However, the use of shade and the prevalence of species-rich and structurally complex shade canopy is decreasing worldwide. Coffee and cocoa are cultivated mainly by smallholder farmers.

Coffee and cocoa are drivers of both deforestation and reforestation. In the last two centuries, coffee production was responsible for dramatically transforming the highland landscapes in the New World by displacing sugarcane, cattle, and other minor crops as well as by displacing natural forests. In the last five decades, the expansion of cocoa cultivation led to the disappearance of 14–15 million ha of tropical forests globally. Coffee and cocoa plantations may be established following four different pathways (Figure 5). Transition pathways are not linear either in time or in space.

FIGURE 5: LEAVES TRANSITION PATHWAYS BETWEEN NATURAL FORESTS, COCOA, AND COFFEE AGROECOSYSTEMS



The most relevant recommendations to reduce the deforestation footprint and to increase the contribution of coffee and cocoa agroforestry systems to reforestation include:

Reduction of Deforestation

To strengthen the real-time monitoring of land use and increase the value of forests on private land, governments and producers can improve the legal, institutional, policy, and financial frameworks and enforce protection measures in conservation areas. This includes increased investment in the use of modern technologies to monitor land use changes in real-time. Major cocoa companies, including Mars Inc., have recently committed to zero deforestation supply chains in

combination with other important elements of commodity production. These companies have engaged supply chains that prohibit clearing on carbon-rich peat lands, clearing on high conservation value areas, and clearing on high carbon stock areas. These companies have also engaged supply chains that promote transparency in their production practices. Tools like the Global Forest Watch Commodities and MapHubs (www.maphubs.com) help companies make supply chains traceable and transparent. Additional support to curb deforestation stems from climate initiatives such as REDD+ linked to the United Nations Framework Convention on Climate Change (UNFCCC).

Government and private sector agents can support industry and value chain measures aimed at sourcing only from certified origins not linked to deforestation areas. Further, stakeholders can help enforce zero deforestation pledges as well as support multi-stakeholder platforms aimed at reducing deforestation and securing sustainable coffee and cocoa economies. Recently, the cocoa industry launched the Cocoa and Forest Initiative signed by 22 major cocoa companies and the governments of Cote d'Ivoire and Ghana, the two largest world cocoa producers. The CFI aims at "tackling the triple challenge" of increasing productivity on limited land, reducing pressure on forests and ecosystems, and enhancing climate change resilience and reduced emissions (e.g. a climate-smart cocoa economy).

Reforestation

Reforestation through coffee and cocoa agroforestry systems has three components including (a) retaining trees in the shade canopy, (b) avoiding losing coffee and cocoa areas to other crops and pastures, and (c) replacing monocrops and degraded pastures with agroforest cocoa/coffee.

Increases in the profitability and financial resilience of coffee and cocoa farming can be achieved through several measures including the application of good agricultural and post-harvest practices, certification for sustainability, improving commercial links, financing, etc. Several cocoa sustainability initiatives have been launched by major companies such as Chocosuisse, Blommer Chocolates, Starbucks, Nestlé, Lindt & Sprüngli, Mars, Ferrero, Kraft Foods, and Hershey. Supporting the development of value chains for the on-farm production of timber and fruits can also help.

Optimizing the trades-off between the crop husbandry intensification to increase cocoa yield, the reduction in shade level (tree cover), and species richness can also help reforestation. Conceptual models and tools for the optimization of these trade-offs are needed.

Companies, governments, and NGOs can come together to improve the legal, institutional, policy and financial frameworks to make trees in the shade canopy more attractive to farmers, extension services, policy makers, development planners, and financial institutions.

Partnership initiatives can promote the vision of timber trees as crops that need proper management to fully realize their contributions to both livelihoods and the environment. Successful examples of such initiatives include policies in Honduras and Colombia (timber in coffee farms), partnerships in Ethiopia (with Nespresso), the Forestry Law in Guatemala (agroforestry in smallholder farms), and coffee certification such as the Smithsonian Bird Friendly® and Rainforest Alliance standards.

Can these policies work?

Deforestation in West and Central Africa's forest frontiers continues at a fast rate due to the expansion of cocoa. Human migration into sparsely populated forest areas also continues. National legal and institutional frameworks still need improvements to motivate farmers to retain natural forests on private land. Both political will and financial resources seem insufficient to achieve real-time monitoring of deforestation and enforcement of forest protection in national or jurisdictional conservation areas. The cocoa industry has made great advances in coordination among companies and with other stakeholders in the standardization of approaches and criteria to measure success. There has also been success in embedding these initiatives in national programs and policies. However, the impacts on the ground remain modest because success depends heavily on the capacity of the national governments to prevent, mitigate, and repress the driving forces behind deforestation.

Deforestation linked to coffee expansion is a lower order of magnitude than cocoa, but it is happening in areas such as the Amazon regions of Peru and Ecuador in Central America. Governments and other stakeholders in coffee producing countries do not seem to have the urgency and degree of concern observed for cocoa; the coffee industry does not have the same level of organization, initiatives, tools, and scale of interventions reserved for cocoa. Many stakeholders consider coffee a benevolent, ecologically friendly use of land. As a result, many consider coffee's impact on forest loss to be somewhat compensated by the planting of coffee, particularly when it is planted in agroforestry systems with a diverse tree shade canopy.

The value of coffee and cocoa as drivers of reforestation and as on-farm tree retention tools is under threat due to crop husbandry intensification. The common wisdom is that low shade or no-shade systems are winning the productivity battle. Much needs to be done to change this common misconception. The persistence of shaded systems is directly dependent upon both the profitability and resilience of the coffee/cocoa farm, and the legal, institutional, policy and financing frameworks for trees on farms. Significant changes are needed on both fronts. Profitability depends on yields (of both crop and shade trees), prices and costs, but most of the focus is on increasing crop yields.

A new vision is needed to fully assess the economic performance of coffee and cocoa agroforestry systems.

This new vision must include five factors. First, the new vision must include the risks and vulnerabilities associated with coffee/cocoa price volatility, especially in intensive systems with heavy capital investment in inputs. Second, the vision must account for the additional income streams and opportunities for self-sufficiency provided by timber, firewood, and fruit sales ad self- consumption. Third, the vision must balance the need to improve the coffee/cocoa, timber, and fruit value chains simultaneously. Fourth, the vision must offer properly tailored certification schemes and payments for ecosystems services to increase crop prices and secure other sources of income. Fifth and finally, the vision must include better legal, policy, and financial frameworks to stimulate farmers to plant, manage, harvest, and use on-farm timber. With the exception of certification, advances on each of these fronts alone are insufficient to ensure that coffee and cocoa agroforestry systems are financially and ecologically attractive alternatives to other land uses. All five factors must be addressed simultaneously.

Concerted actions between governments (national, jurisdictional), industry and other value chain actors, farmers, financial institutions and donors are essential to address the many facets of these pressing issues. The central goal of joint efforts should be to simultaneously minimize the deforestation footprint of coffee/cocoa cultivation and maximize its role as an agent for reforestation.

CASE STUDY #6
Agroforestry Shea Parklands of sub-Saharan Africa: Threats and Solutions

Natural stands and managed shea agroforestry parklands are found across 300-350 million ha of Sahel-Sudanian-Savanna Africa (Figure 6).[8] Over millennia of human activities, indigenous wild woodlands have been converted to wooded and farmed parklands in which naturally regenerating trees are selected, protected, and managed during a rotational farm-fallow system. Shea butter and other non-timber forest products (NTFPs) or tree crops are staples of village diets as well as a significant (10-25%) source of household income through village-level production. Women are heavily reliant on tree crops such as shea butter for their livelihoods.

Shea butter is of major dietary importance across a zone of Africa that is home to 200 to 300 million people. Shea annually provides 7 to 10 kilograms (kgs) of dietary fat per person for many communities. In addition to its nutritional value, shea is traditionally used for personal cosmetic care. Shea butter became a key ingredient in the international personal care industry in the 1980s when the firm L'Occitane first began using it in boutique cosmetics. Extensively promoted in international advertisements, most consumers, researchers, and development workers alike incorrectly perceive hand-crafted, cosmetic use of shea as its main function for sale. However, shea use in cosmetics totals only 10% of total exports and agroforestry parkland management, edible demand and bulk shea production is still invisible to global consumers.

8 https://www.sciencedirect.com/science/article/pii/S0143622815000387

FIGURE 6. SHEA PREVALENCE AND SUITABILITY IN SUB-SAHARAN AFRICA

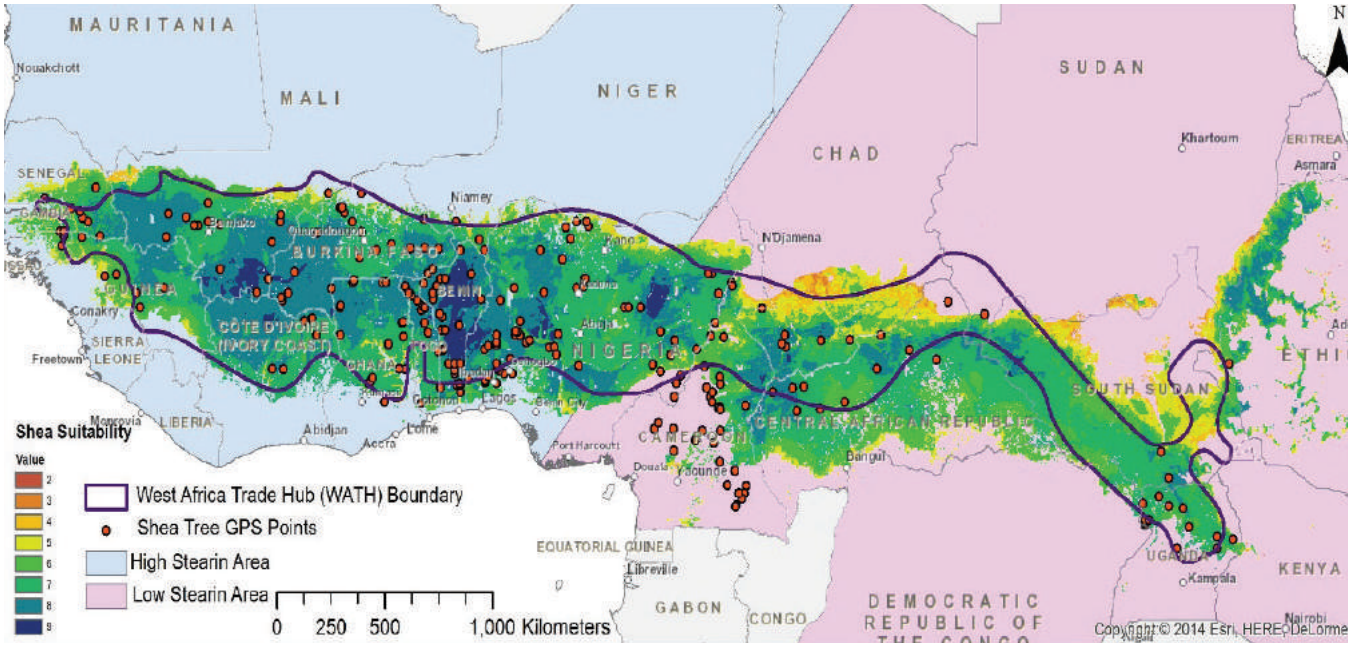
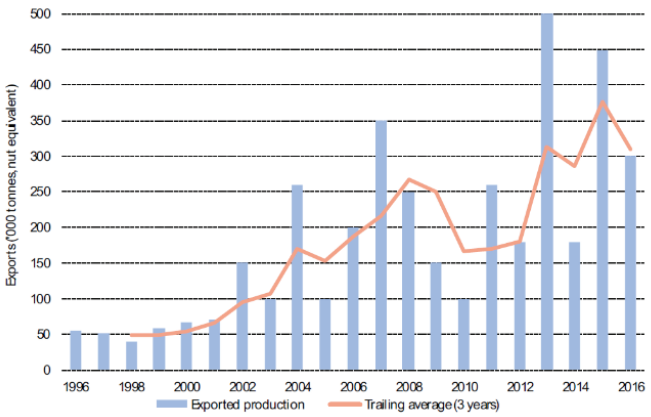


FIGURE 7. ANNUAL EXPORT OF SHEA BUTTER 1996—2016



Source: www.lmc.co.uk

In fact, the greatest international demand for shea is in the confection industry, which demands high-tech processing. Since 1960, fractionated shea stearin has been increasingly used as a cocoa butter alternative (CBA) in chocolate. Since the EU cocoa and chocolate directive 2000/36/EC came in to force in August 2003, there has been a 600% surge in annual demand for shea kernels. Annual exports have risen from an average of about 50,000 to between 300,000 to 350,000 equivalent tons of shea kernels (Figure 7).[9]

Despite their nutritional, economic and ecological importance to local communities**,** shea parklands are significantly threatened by land use change as millions of shea and other trees are cleared annually to accommodate modernized farming systems, urbanization, mining and extraction of wood products.[10] Rapidly declining tree densities across these landscapes are linked with declining soil fertility, poor water infiltration, and erratic or reduced rainfall (Figure 8).[11,12] In addition, the mosaic of fallows–once vital for sustainable wood fuel and regeneration of the tree-based agroforestry system–are being reduced in size or are disappearing entirely.[13] Meanwhile, herbicides impact plant growth and insecticides, coupled with habitat loss, correlate with collapsing insect populations (notably social bees and pollinators of shea) leading to lower crop yields and reduced migratory bird numbers. A recent newspaper (The Daily Matrix, June 25, 2018) listed shea butter among the 'vulnerable plant extracts' that are under threat to over-collection or unsustainable levels of trade and therefore

9 http://www.globalshea.com/uploads/files/press_releases/lmc_press_release_final_854.pdf

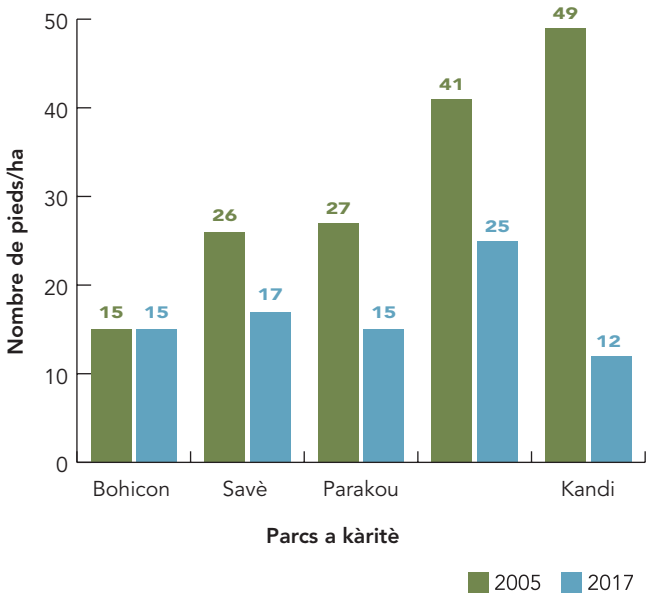
10 https://www.myjoyonline.com/news/2018/July-13th/heartbreak-for-farmers-as-outbreak-of-strange-disease-destroys-hundreds-of-shea-trees.php e

11 Gnangle, P. (2017), le karité Béninois: entre promotion des femmes rurales et création durable de valeur ajoutée. 115 p. Rapport d'étude. PARASEP

12 https://www.sciencedirect.com/science/article/pii/S1877343513001346

13 http://www.birdlife.org/africa/news/empowering-women-make-sustainable-shea-butter

FIGURE 8. DECLINING SHEA TREE DENSITIES ACROSS BENIN, 2005-17



discourage patronization of shea-based products. However, shea as an agroforestry product is not under immediate threat and shea supplies can meet short to medium term demand.

Shea kernels collection is not the enemy in the shea parklands. Other drivers are the cause of parkland degradation and there is urgent need to encourage respect for, and to implement protection of, existing parkland resources by all stakeholders operating in the zone. Contrary to the misconstrued perception that shea trees are wild, untameable, and slow to mature, shea trees are quite conducive to management. Shea is a pioneer tree species that has been managed and semi-domesticated in ancient parklands. Shea is easily propagated from both fresh seed (fruition occurs 7–15 years after planting) and grafted scions (fruiting after 3–5 years).

Progress to date

Shea tree research has remained limited to research stations and parkland sustainability programs including those championed by the USAID-sponsored Global Shea Alliance. Shea champions have begun to unite their efforts to restore shea parklands. Challenges to restoration abound and include tenurial insecurity, poor environmental control, and the scarcity of resources such as seedlings and management skills. Attempts at governmental control, monopolized marketing boards, inappropriate taxation, and price fixing have acted as disincentives to investment and growth. Mass outward migration, terrorism, political instability, community tensions, and climate change further threaten the shea sector and the communities inhabiting the shea ecozone that stretches across sub-Saharan Africa. Further, market structure and limited consumer awareness of shea's contribution to chocolates and confections prevent full exploitation of

the market's possibilities for expansion into new markets. These market challenges are compounded by competition from other CBAs and the absence of appropriate edible oil regulatory standards. Finally, it needs emphasizing that existing structures, like the Global Shea Alliance, are not designed for landscape restoration, nor do they have appropriate remit, skills or adequate financing[14] currently at their disposal. It might be beneficial to strengthen local capacity for the shea agroforest parkland restoration agenda coupled with a new regional body/alliance that is inclusive of stakeholders from all landscape sectors, including agricultural, urbanisation, mining, tree crops, and wood products to better address the multifaceted pressures on this landscape.

Surveys on parkland health, the nutritional value, and the socio-economic importance of shea are urgently needed. Also necessary are studies on the extent of shea butter's impact on women at the village level, who rely heavily on shea production for their livelihoods. To achieve multiple goals including environmental sustainability, agribusiness licenses and financing could be tied to satisfying restoration and green energy targets in addition to supporting business plans for farmers and investors for effective shea propagation and breeding. Bilateral and multinational donor agencies can play a major role in supporting such efforts. Stakeholders can help to improve the perception of shea as a multipurpose commodity tree crop that has nutritional, medicinal, therapeutic, ecological, climate stabilizing, and socioeconomic value to stimulate donor, local government, and community action. A landscape and holistic approach that involves a wide range of shea parkland stakeholders should be brought together to share and discuss the findings of this LEAVES study. Having established reality and threat awareness, such an event should be geared towards getting the mandate, with committed engagement, to identify the major information gaps and develop a road map for the way forward—implementation of the delivery mechanisms. With access to finance and an inclusive regional plan, shea parklands can be restored into sustainable and productive cropping systems—of food, wood fuel and other products.

14 http://www.globalshea.com/news/current/224/GSA-Supports-109-Million-Proposal-to-Scale-Up-Sustainability-Program-. However, only 1.75 million shea trees are projected to be planted with no reference to other tree species in the parkland, over 7 years equivalent to increasing production by below 10,000 tons per annum

Local Women Transporting Shea Kernels for Processing ©P. Lovett

Kurmuk BlueNile Sudan ©Arsenie Coseak

RECOMMENDATIONS

ON THE ROLE OF MARKET ACTORS

Adjust expectations for what can be achieved through unilateral, corporate deforestation commitments; look beyond corporate risk management to collaborative, public-private partnerships that foster solutions act scale.

1. Corporate deforestation and sustainability pledges are important but alone are insufficient to drive large-scale changes in deforestation or tree enhancement. In some cases, pledges contribute to a polarization of dialogues between farm sectors and environmental groups.

2. An additional, often highly effective private sector contribution to sustainable development in tropical forest regions comes in the form of public-private and buyer-producer partnerships. Companies can, and increasingly do, promote forest-preservation and tree-enhancing practices through technical, commercial, and financial partnerships with farmers, communities, and regional authorities. This is a very important new trend.

3. Sustainability certification does not reach the majority of farmers. Certification does not reach those farmers who cannot afford upfront investment or audits nor does it reach growers of commodities for which a certification system has not yet been developed. Effective certification requires more flexible systems that recognize and reward progress and that assure value chain transparency regardless of the starting point. Many certification standards are evolving to address these challenges.

4. Pay-for-performance systems for REDD are still rare, but are energizing governments and communities that are taking definitive policy and programmatic steps to reduce deforestation and forest degradation or to enhance tree cover. While there are some examples of progress, in general, the pace and scale of carbon premiums, of payments for tree enhancement, and of compensation for avoided deforestation are inadequate. Equitable benefit sharing mechanisms coupled with inclusive land rights, legal frameworks, and accessible and transparent grievance redress mechanisms are urgently needed, and are being achieved in some important cases.

5. Harmonization with government policies and programs is essential. For commodity production systems that include tree cover, there is an urgent need to ensure improvements in local legal frameworks so that farmers can sustainably harvest and use trees as appropriate. In many cases, existing regulations prevent farmers from harvesting and marketing trees. Furthermore, technical and financial incentives are often necessary for local wood processors to use and transform wood from shade tree and SPS for markets.

ON THE ROLE OF GOVERNMENTS AND THE INTERNATIONAL COMMUNITY

Governments and the international community needs to frame strategies for slowing deforestation and enhancing tree cover in ways that garner support among voters and governments of producer regions

6. Command and control approaches to tropical deforestation can work for a while. It is possible for governments to suppress deforestation across vast forest frontiers through strong political will, command-and-control strategies coordinated across relevant agencies, and the appropriate legal instruments. Sustaining this achievement, however, is challenging. Punitive strategies must rapidly evolve to accommodate positive incentives for those farmers who are making the transition to forest-preservation and sustainable production systems.

7. Jurisdictional approaches are making progress in achieving harmonization across policy and practice. When public policies and programs are aligned with value chain interventions, regional transformations are possible. Jurisdictional approaches help achieve this harmonization through multi-stakeholder processes that establish a shared vision and set of goals for a region. Some companies are shifting to sourcing commodities from sustainable jurisdictions to comply with their evolving corporate social responsibility commitments. Jurisdictional and value chain approaches to sustainability are best seen as complementary elements of regional strategies that can accommodate the varying needs of the market.

8. Although there are obstacles, t**ree enhancement in production systems can be embraced by governments.** Governments' arguments for tree enhancement in coffee, cocoa, and shea parkland and in livestock systems are strong and include greater productivity, food security, social benefits, and protection and restoration of ecosystem services. Countering governments' arguments are misconceptions of the benefits of modern production systems, knowledge transfer barriers, and institutional silos. There are generally

few coordinated and effective interactions between ministries of agriculture and ministries of the environment and natural resources. In addition, integrated interventions do not routinely feature prominently in the agendas and programs of extension agencies and local financial institutions. These gaps offer major opportunities for action across the institutional jurisdictions and respective mandates.

9. The governmental case for ending deforestation is still generally weak. In most tropical forest nations, the social and economic arguments for foregoing the short-term wealth, food security, and livelihood benefits of forest conversion are still largely absent. The economic opportunity costs of forest conservation associated with forgone agricultural profits are often seen to be far more certain than the social and environmental costs of forest loss.

10. Many governments are ready to discuss sustainable sourcing agreements. The zero deforestation movement might productively come to fruition through sustainable commodity sourcing agreements between producer governments and importing governments. Such agreements could eventually provide a unified framework for defining sustainability and establishing the incentives to achieve sustainability in practice. Advances in the traceability of all segments of the value chain can contribute significantly to supporting zero deforestation.

11. Good planning is essential to go from governmental pledge to practice on the ground. Nation-wide planning processes frequently lack maps that identify agricultural and livestock areas that should be set aside for forest regeneration and those that should be rehabilitated for more intensified production with special attention to tree-enhancing production systems.

ON THE ROLE OF FARMERS

Foster regulatory, financial and market enabling conditions that help farmers and villages that are successfully maintaining forests and increasing woody perennials/tree cover to be more competitive than those who are not.

12. Successful strategies to slow deforestation and/or enhance tree cover start with the farmer. These strategies begin with an accurate, holistic understanding of current production systems and the logic and risk management embedded in these systems. Successful strategies include information on the major pathways that agricultural transitions can follow to become more forest-friendly and productive. Examples of such pathways include increased soil fertility and water infiltration improvements due to increased tree cover. When mapping these pathways, the farmer must understand the logic behind strategic systems, interventions, and the obstacles and risks they will face in making the transition.

13. Recognize and reward innovators and let them multiply. There is tremendous potential to expand low or zero deforestation agricultural production while also fostering large-scale tree cover enhancement in deforested landscapes. The challenge is to enable farmers who are already using innovative, tree-friendly practices to continue while ensuring the neighboring farmers appreciate the monetary and intangible benefits of these innovations. Farm sector support is much easier to win for zero net deforestation than zero deforestation. This is especially true if the latter imposes restrictions on farmers that go above and beyond government land-use regulations.

14. Effective consultation is essential for agro-industrial farmers, not just small-holders and communities. Farmers and national governments are showing signs of backlash against the tropical zero deforestation agenda. This backlash is driven by unmet farmer expectations that the shift to forest-preservation and sustainable production systems would bring recognition, price premiums and other positive incentives.

15. Financial mechanisms that deliver capital to small-scale producers, especially women, who maintain or enhance tree cover are still in short supply.

16. The lack of a clear definition of land tenure and usufruct rights continues to be a chronic impediment to tree cover enhancement on farms and in deforested landscapes.

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