

Business Models to Encourage Private Sector Participation in Sustainable Land and Forest Landscape Management

Investing in Climate Change Adaptation through Agroecological Landscape Restoration: A Nature-Based Solution for Climate Resilience
(Technical Assistance 6539)

October 2023



Forested Landscape in Bohol, Philippines (photo by Kenichi Shono).





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Deliverable summaries

TA-6539 Investing in Climate Change Adaptation through Agroecological Landscape Restoration: A Nature-Based Solution for Climate Resilience led to the preparation of the following knowledge products:

- KP1 (1): Landscape Restoration Country Profile: Philippines
- KP1 (2): Landscape Restoration Country Profile: Cambodia
- KP3: Business Models to Encourage Private Sector Participation in Sustainable Land and Forest Landscape Management
- KP4 (1): Climate Change Risk and Adaptation Options Assessment – Sangker River Basin, Cambodia
- KP4 (2): Climate Change Risk and Adaptation Options Assessment – Manupali Watershed, Mindanao River Basin, the Philippines
- KP5: Good Practices Manual on Biodiverse Forest and Landscape Restoration
- KP6: Community-based Climate Vulnerability Assessment and Adaptation Planning for Resilient Agroecosystems
- KP7: Applying Advanced Technologies in Support of Landscape Restoration and Climate Change Adaptation
- KP8 (1): User Manual: Sangker River Basin Decision Support System
- KP8 (2): User Manual: Mindanao/Manupali River Basin Decision Support System
- KP8 (3): Admin Manual: Sangker River Basin Decision Support System
- KP8 (4): Admin Manual: Mindanao/Manupali River Basin Decision Support System
- KP9 (1): Restoration plans for demonstration areas in Cambodia and the Philippines
- KP9 (2): Gender and Social Inclusion in the Mindanao River Basin, the Philippines, and the Sangker River Basin, Cambodia
- KP10: Integrating the principles of ecological agriculture into upland farming systems of Manupali Watershed, the Philippines

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Cover page: Forested Landscape in Bohol, Philippines (photo by Kenichi Shono)

Back page: Bohol Landscape (photo by Henrik Kal)

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Abbreviations

ADB	Asian Development Bank
CLT	Cross Laminated Timber
CO ₂	Carbon Dioxide
FAO	Food and Agriculture Organization
FES	Forest Environmental Services
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GHG	greenhouse gas
ICEM	International Centre for Environmental Management
ICRAF	World Agroforestry
NGO	Non-Governmental Organisation
NTFP	Non-Timber Forest Products
PES	Payments for Ecosystem Services
PFES	Payment for Forest Environmental Services
PPP	Public Private Partnerships
RA	Rainforest Alliance
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SMFES	Small and Medium Sized Forest-based Enterprises
UNFCCC	United Nations Framework Convention on Climate Change

Weights and Measures

C	Celsius
Gt	Gigaton
ha	hectare
km ²	square kilometer
m ³	cubic meter

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Executive Summary

The world is confronting two large and inter-related threats at the same time: climate change and biodiversity loss. The Food and Agriculture Organization (FAO) estimate that since 1990, 420 million hectares of forest have been lost through conversion to other uses. Southeast Asia that accounts for approximately 20 percent of the world's forest cover and hosts the richest biodiversity in the world, has one of the highest rates of deforestation and forest degradation, with significant implications for biodiversity, ecosystems services and human welfare.

The proximate and underlying drivers of deforestation vary by time and place, often reflecting broader economic and political structures. Proximate drivers include agricultural encroachment, monoculture and commodity production, fires, and infrastructure. Underlying drivers include population growth, liberal international trade regimes, climate change, narrow institutional mandates which fail to reflect ecological sustainability, and economic growth. Whilst some broader trends such as population growth, international trade, and economic growth with attendant increases in consumption, urbanisation and infrastructure investments often appear hard to manage the evidence and experience of many countries suggests that it is possible to build institutions and policy regimes to guide more sustainable behaviours and patterns of development.

The private sector is increasingly being seen as part of the solution to the destruction and degradation of the environment. With the right incentives and guardrails there is no intrinsic reason why the pursuit of profit and social and environmental goals cannot be complementary. Moreover, when private sector behaviour is understood to be in large part a response to regulations, norms, policies, and financial regimes, the role of government in influencing private sector behaviour becomes clear, as does the potential for the private sector to more efficiently and effectively leverage resources and expertise to deliver sustainability objectives.

Yet, encouraging the private sector to adopt opportunities and business models that are both profitable and sustainable is not straight forward. In most countries governments will need to implement some level of reform to set incentives and put in place enabling frameworks at the national and landscape level. Even so, experience suggests that although sectoral and siloed approaches are increasingly regarded as inadequate, more holistic and integrated approaches that incorporate diverse and potentially oppositional stakeholders are often difficult to implement, pointing to the need for careful planning, prior analysis, and potentially more limited ambition at least in the short term.

The social, environmental, and financial benefits of doing so can be substantial. As carbon sinks, forests reduce the rate at which carbon builds up in the atmosphere. Forests have removed an estimated two billion metric tons of carbon from the atmosphere since 2000.¹ Tackling deforestation and forest degradation can be one of the most cost-efficient ways of mitigating climate change.² Terrestrial and aquatic ecosystems also produce goods and services that generate very real economic returns of an estimated \$125-140 trillion per year.

This report sets out potential opportunities for private sector actors to realise these benefits, including:

- **Intensive agriculture**, which, if complemented by controls over land use and support to farmers, can increase the output of existing plots relieving pressure on vulnerable landscapes.
- **Wood products** such as building materials, pulp and paper and wood as a source of energy.
- **Agroforestry**, including the production of non-timber forest products can enable farmers to both achieve sustainability and improve productivity.

¹ Harris, N.L. et al. 2021. Global maps of twenty-first century forest carbon fluxes. *Nature Climate Change*. 11. pp. 234–240.

² Norheim. 2017. Mitigation and adaptation to climate change through sustainable rainforest management. *Research & Reviews: Journal of Ecology and Environmental Sciences*. 5-1.

- **Ecotourism**, especially suitable for micro and small enterprises, can provide jobs, improve local welfare, and attract local funding to protected areas and conservation efforts.
- **Plantations** which maintain ecological services and maintain biodiversity in zones, networks and corridors, are typically easier to manage than natural forests with a better economic return.
- **Selection forest systems**, that maintain areas in a similar way to natural forests can, if well managed, provide significant economic returns.
- **Conservation agriculture**, which has the potential to improve crop productivity with increased resource use efficiencies, and higher economic returns.

Businesses can be encouraged to pursue these opportunities through the deployment of a series of business models that can be adopted to develop the wider institutional and regulatory framework, and provide funding, set incentives and address capacity concerns. The models deployed will depend on context and capacity, and will vary by sector, place and time:

- **REDD+ provides a useful framework and source of funds for governments to manage restoration programs.** Whilst REDD+ can be time consuming and costly to implement it can set the foundations for successful policies and collaborative efforts for reducing forest degradation.
- **Certification schemes**, of which the Forest Stewardship Council (FSC) is the leading certification body, help with traceability, monitoring and setting the broader regulatory environment.
- **Value chains** are central to the development of any sustainable business model. There are three essential approaches to exploit value chains to tackle deforestation: encourage actors within value chains to undertake forest activities, strengthen the components of existing value chains and incorporate existing businesses into value chains.
- **Public Private Partnership (PPPs)** models can help governments to improve the efficiency and productivity of sensitive landscapes and increase the provision of ecosystem goods and services.
- **Community forestry** with the right help and incentives can unlock the potential of local and indigenous communities who often have long experience and attachment to forest land and are in a better position to conserve forest land in conjunction with sustainable use.
- **Financing forest operations and reforestation is central to sustainable forest management.** Access to funding can be improved, however, with the deployment of a range of financial instruments including Green Bonds, competitive funds, debt for nature swaps and small-scale models to support small-scale farmers and businesses access finance.
- **Payments for ecosystem services (PES) can be a suitable solution to the problem of accounting for externalities establishing effective programs.** Careful program design is required to ensure PES programs identify and account for efficiency and equity trade-offs, monitoring costs, the rightful allocation of rights and responsibilities and sufficient stakeholder buy-in.

1 Introduction

1.1 The Linked Challenges of Climate Change and Biodiversity Loss

The world is confronting two large and inter-related threats at the same time: climate change and biodiversity loss. The United Nations (UN) 2030 Agenda for Sustainable Development stresses the need for an integrated approach to achieving the Sustainable Development Goals (SDGs) by harnessing synergies and minimizing potential trade-offs.

Underlying those challenges is the rapid decline in land resources. Land degradation is intimately linked to forest and habitat loss, contributing to a decline in the productivity of forest and wetland ecosystems, croplands and rangelands all over the world. The deterioration or loss of the productive capacity of the soils affects global food security and food prices and leads to climate change with more climate related disasters, as well as loss of ecosystem services.³

Globally, about 25 percent of total land area has been degraded, with the release of soil carbon and nitrous oxides into the atmosphere (GEF 2021)⁴; 24 billion tons of fertile soil is being lost annually, largely due to unsustainable agriculture practices.⁵ The Agriculture, Forestry and Other Land Use sector is responsible for almost a quarter of the global Greenhouse gases (GHG) emissions.⁶

The FAO estimate that since 1990, 420 million hectares of forest have been lost through conversion to other uses. Although in the last thirty years the rate of deforestation has decreased, the world still loses around ten million hectares per year (FAO 2021).⁷ Southeast Asia is among the highest in the world and the most severe in terms of biodiversity loss.⁸ Degradation of forest flora and fauna has severe consequences for human welfare, since biodiversity is closely linked to the functioning of various forest ecosystem services such as soil conservation, genetic resources conservation and carbon sequestration.

By 2020, none of the 20 Aichi Biodiversity Targets were met completely, although, 89% of related national targets saw some progress.⁹ The Targets were established in 2010 under the U.N. Convention on Biological Diversity (CBD) to stop biodiversity loss and preserve essential ecosystem services by the (CBD). Aichi Target 11, for example, includes protecting at least 17 percent of land and inland waters and ten percent of the marine environment by 2020.

There is a close interrelation between deforestation, land degradation, loss of biodiversity, and poverty. Rural poverty leads to deforestation, increasing erosion, landslides and other forms of land degradation, which worsens poverty. Globally, 3.2 billion people are affected by land degradation, especially rural communities, smallholder farmers, and the very poor.¹⁰ The world population is projected to increase to 9.9 billion by 2050, with rising demands for agricultural products including food, feed, fibres, and fuel. The pressure on land resources is increasing due to other factors, such as urbanization, agricultural production systems made less resilient by the loss of biodiversity, and natural factors such as climate variability and extreme weather events. Climate change exacerbates variations in yields and income from agriculture, threatening the resilience of agro-ecosystems and food production systems.

³ <https://www.decadeonrestoration.org> (accessed November 2021).

⁴ Global Environment Facility. 2022. <https://thegef.org/> (accessed January 2022).

⁵ FAO. 2021. *The State of the World's Forests 2020*. <https://www.fao.org/state-of-forests/en/> (accessed November 2021).

⁶ Pradhan, B.B., Chaichaloempreecha, A. & Limmeechokchai, B. 2019. GHG mitigation in Agriculture, Forestry and Other Land Use (AFOLU) sector in Thailand. *Carbon Balance Manage.* 14 (3).

⁷ Global Forest Watch. 2021. <https://globalforestwatch.org/> (accessed November 2021).

⁸ Estoque, R.C., Ooba, M., Avitabile, V. et al. 2019. The future of Southeast Asia's forests. *Nat Communications.* 10 (1829). <https://www.nature.com/articles/s41467-019-09646-4>

⁹ Secretariat of the Convention on Biological Diversity. 2020. *Global Biodiversity Outlook 5*. Montreal. <https://www.cbd.int/gbo5>

¹⁰ Global Environment Facility. 2022. <https://thegef.org/> (accessed January 2022).

For those reasons, more than 100 countries at the United Nations Framework Convention on Climate Change (UNFCCC) COP26 climate talks in Glasgow 2021 pledged to halt and reverse forest loss and land degradation by the end of 2030, underpinned by \$19 billion in public and private funds to invest in protecting and restoring forests. If implemented effectively, the Glasgow Declaration on Forest and Land Use will save more than 33 million km² of forests.

The UNFCCC Paris Agreement 2015 was a positive step forward, but compliance so far suggests that Nationally Determined Contributions (NDCs) must increase. Adhering to the NDCs until 2030 induces a substantial carbon lock-in with long-lasting effects beyond 2050. The carbon lock-in leads to approximately 90 Gt CO₂ more emissions until 2030 and 250 Gt CO₂ more emissions until 2050 compared to the least cost 1.5 °C pathways. Trade-offs exist between the mitigation ambition until 2030, transitional challenges 2030-50, and carbon dioxide removal (CDR)^{11,12} requirements, including reforestation and carbon capture and storage. Any delayed reduction in greenhouse gas emissions would mean more use of CDR.

The UN decade on ecosystems restoration (2021-2030)¹³ is co-managed by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO), and aims to prevent, halt and reverse the degradation of ecosystems on the continents and in the ocean. The measures to achieve restoration targets will help reduce poverty, combat climate change, and prevent a mass extinction of species.

The Post-2020 Global Biodiversity Framework was discussed in CBD-COP15 in Kunming, China October 2021, and final decisions will be crafted during the follow-up conferences in 2022. The core proposal “30 by 30” is a plan to conserve 30 percent of global land and sea areas by 2030 through “area-based conservation measures” such as national parks, reflected in countries’ National Biodiversity Strategies and Action Plans (NBSAP). However, some indigenous representatives and their allies have criticized the plan due to the fear of indigenous peoples being evicted from their ancestral territories. Today, 22.5 million km² (16.64 percent) of land and inland water ecosystems and 28.1 million km² (7.74 percent) of coastal waters and the ocean are within documented protected and conserved areas, an increase of over 21 million km² (42 percent of the current coverage) since 2010.

The Protected Planet Report 2020 (updated May 2021)¹⁴ calls for existing protected and conserved areas to be identified and recognized, by counting on the efforts of indigenous peoples, local communities, and private entities. It recognizes the rights and responsibilities of these stakeholders and considers their conservation efforts remain undervalued. The report identifies nine opportunities to support the implementation of the Post-2020 Global Biodiversity framework, including following two that are important for business development:

- The potential of protected and conserved areas to act as nature-based solutions to multiple socio-environmental challenges, including climate change, water security, and disaster risk

¹¹ An IPCC Special Report (2018) deals with the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Carbon dioxide removal (CDR) refers to the process of removing CO₂ from the atmosphere. Since this is the opposite of emissions, practices or technologies that remove CO₂ are often described as achieving ‘negative emissions’. The process is sometimes referred to more broadly as greenhouse gas removal if it involves removing gases other than CO₂. There are two main types of CDR: either enhancing existing natural processes that remove carbon from the atmosphere (e.g., by increasing its uptake by trees, soil, or other ‘carbon sinks’) or using chemical processes to, for example, capture CO₂ directly from the ambient air and store it elsewhere (e.g., underground).

¹² IPCC. 2018. Global Warming of 1.5°C. [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.).

¹³ Idem

¹⁴ UN Environment Program. 2021. *Protected Planet Report 2020*. <https://www.unep.org/resources/protected-planet-report-2020>

management, thereby contributing to the implementation of several global conventions, should be recognised and enhanced.

- More integrated approaches to conservation and sustainable use can be developed if protected and conserved areas are mainstreamed across national policies and planning.

In the past, the private sector was often considered a stakeholder that only exploited and degraded the forests and other natural resources. However, many private sector initiatives have promoted sustainable management, especially through certification mechanisms. Now, the proven link between the deforestation and carbon emissions has moved many private sector firms to the forefront of an alliance to provide solutions to the climate and biodiversity crisis.

The New York Declaration on Forests (NYDF)¹⁵ of 2017 is an initiative that has brought most private forestry actors onboard, being endorsed by more than 50 of the world's largest companies. It has turned into a global platform of the public and private sector, as well as civil society, that aims to increase ambition, forge new partnerships, and accelerate progress on the NYDF goals.

1.2 Purpose of the Report

Increasingly the private sector is seen as part of the solution to the destruction and degradation of the environment. The reframing of business to support welfare and environmental goals stems from the assumption that corporate profit and corporate social goals can be complementary and that businesses can more efficiently and effectively leverage resources and expertise to deliver sustainability objectives.

However, the private sector is complex, and covers many different actors and sectors. Broadly, it can be organised into goods and service sectors, which includes finance. Private enterprises involved in some way with the forestry sector range from small farms, smallholders and community groups to large conglomerates as well as partnerships between the private and public sector.

These actors don't operate in a vacuum but are connected in complex networks which determine incentives and govern the availability of inputs, finance and knowledge as well as access to markets. The private sector must be understood to operate in tandem with the public sector not apart from it. It operates in response to regulations, norms, policies, and financial regimes which are all to a large extent determined by governments, at the domestic and international level.

This report broadens the scope of the discussion to include the broader regulatory, legal and institutional environment which determine the incentives and constraints faced by private actors. Where this broader environment is supportive of initiatives to involve the private sector progress is possible. Where regulations, institutions and broader frameworks work in opposition or serve to provide contradictory incentives efforts to promote more sustainable business models may be doomed to failure.

In principle a business model describes how any given enterprise – large or small, informal or formal – does business, markets its products and sources inputs and finance. Individual business models will vary according to sector, product and market, and where an enterprise sits in its supply and value chain. Business models will vary over time and place. This report will not prescribe detailed business models. Instead, it will set out a series of potential business opportunities that private actors might pursue. It will outline approaches that governments and other stakeholders can take to develop the broader frameworks within which enterprises operate and support and incentivise them to develop more sustainable business models.

This report is organised as follows. **Section 2** describes the extent of deforestation at the global level and in Southeast Asia before describing the main drivers of deforestation and demonstrating how an understanding of these drivers can guide efforts to develop sustainable business models. **Section 3**

¹⁵ Forest Declaration Platform. 2021. *Forest Declaration Platform: Transforming commitments into action*. <https://forestdeclaration.org>

sets out the importance of sustainable landscapes as tools to mitigate the impacts of climate change and as providers of valuable ecosystem goods and services. **Section 4** sets out the challenges to successfully encouraging the take-up of sustainable business models, suggests a series of business opportunities that are both profitable and sustainable and business models that can be deployed to improve the broader framework within which business operate.

2 Deforestation, Forest and Land Degradation

2.1 Deforestation at the Global Level

Deforestation is an ancient process, probably as old as human habitation of the planet.¹⁶ Since at least the Ice Age people across the globe have thinned, changed and destroyed forests for the resources forests provide and to make room for agriculture, infrastructure and human settlement. Deforestation accelerated in the mid-20th Century, driven by population growth and the rapid increase in demand for food, space, and commodities. By some estimates since the 1950s more than half of the world's rainforests have been lost.

Most modern deforestation has taken place in tropical and sub-tropical countries. Analysis suggests that the main drivers are permanent land use change for commodity production, forestry (26 percent), shifting agriculture (24 percent), and wildfire (23 percent).¹⁷

2.2 Deforestation in Southeast Asia

Southeast Asia accounts for approximately 20 percent of the world's forest cover and hosts the richest biodiversity in the world. However, the region also has one of the highest rates of deforestation, with forest cover reducing 12.9 percent between 1990 and 2015 (IPBES 2018), and a loss of some 38,000 km² between 1990 and 2020.¹⁸

National reporting on forest cover often fails to reflect reduced quality and biodiversity. National reporting on forest cover trends can be complicated and misleading due to differences in accounting for new plantation and native forests. Many SE Asian countries, such as Vietnam and the Philippines, report increases in forest cover over the past decade. Yet, native forests in those countries are in decline as they are in Cambodia, Myanmar and Indonesia. Of most concern, primary forest continues to be cleared and poorly reported. Primary forests are made up of native species that have developed naturally, with little or no evidence of human activities, and with original ecological processes remaining largely undisturbed. Many specific types of primary forests are particularly threatened by deforestation and degradation.¹⁹ Plantation forest is expanding but with little biodiversity value and often with negative effects on the condition of watersheds.

Deforestation and degradation have significant implications for biodiversity. Habitat loss in Southeast Asia is among the highest²⁰ and most severe in terms of biodiversity loss overall.²¹ Given these rates, and the fact that some 90 percent of Southeast Asia's forests are still unprotected it is estimated that over 40 percent of the region's biodiversity may vanish by 2100.²²

The drivers of deforestation are like those of other regions and include logging, clear-cutting for food production, cash crops and agricultural encroachment. However, at country level drivers differ and reflect the demographic, economic and political settings in each country.

2.3 Main Drivers of Forest and Land Degradation

A process of steady degradation of natural forests leading to total conversion to other land uses is common in many tropical and subtropical countries of Asia. Depleted native forests can be reclassified

¹⁶ Williams, M. 2003. *Deforesting the Earth: From Prehistory to Global Crisis*. University of Chicago Press

¹⁷ Curtis, P et al. 2018. Classifying drivers of global forest loss. *Science*. 361 (6407). pp 1108-1111.

¹⁸ FAO. *Global Forest Resources Assessment*. <https://fra-data.fao.org/AS/fra2020/annualReforestation/>

¹⁹ CIFOR. 2021. *Primary forests in Asia and the Pacific: diversity, status, trends and threats*. Asia-Pacific Forest Sector Outlook: Roadmaps for primary forests conservation and innovative forest technologies. Validation Workshop, 23-24 November 2021. <https://www.foreststreesagroforestry.org/wp-content/uploads/2022/01/Asia-Pacific-Roadmap-Final-Workshop-D2-24-11-2021-Laumonier-Trends-Primary-Forestry.pdf>

²⁰ Achard, F. et al. 2002. Determination of deforestation rates of the world's humid tropical forests. *Science*. 297. pp. 999–1002

²¹ Hansen, M. C. et al. 2013. High-resolution global maps of 21st-century forest cover change. *Science*. 342. pp. 850–853.

²² Estoque, R.C. et al. 2019. The future of Southeast Asia's forests. *Nature Communications*. 10 (1829).

as deforested and repurposed for agriculture and commercial plantations such as palm oil, timber and rubber. For example, since 2000, Indonesia and Malaysia, the world's two biggest producers of palm oil, have added an average 3 700km² a year of new plantations on former native forest land.²³ The loss and degradation of forests can affect the quality of land as water systems are changed, rainfall reduced, and soil depleted. Conversely, land degradation that results from intensive agriculture can damage forest land through water use, nitrates, phosphates and pesticides and air pollution.

2.3.1 Agriculture and Commodities

The conversion of forest land to agriculture and commodity production is the most significant proximate cause of deforestation, although the relative mix between crop and livestock varies. FAO's recent remote sensing survey found that, between 2000 and 2018, almost 90 percent of deforestation was related to agriculture (52.3 percent from expansion for cropland and 37.5 percent from expansion for livestock grazing).²⁴

From 2011 to 2015, 90 percent of deforested land occurred in landscapes where agriculture drove forest loss, but only half was converted into productive agricultural land (Pendrill et al. 2022).²⁵ The expansion of productive agricultural land is a result of activities such as speculative clearing, land tenure issues, short-lived and abandoned agriculture, and agriculture-related fires spreading to adjacent forests. As a result, one-third to one-half of agriculture-driven deforestation does not result in actively managed agricultural land.

Crop and livestock production has a profound effect on the wider environment and is the main source of water pollution by nitrates, phosphates and pesticides. One-third of farmland is degraded, up to 75 percent of crop genetic diversity has been lost and 22 percent of animal breeds are at risk.²⁶ More than two-thirds of human water use is for agriculture, rising to four-fifths in Asia.²⁷ Agriculture is also the major anthropogenic source of the greenhouse gases (GHGs) methane and nitrous oxide, contributing massively to other forms of air and water pollution.²⁸ The impact can be indirect, as the introduction of new crops displaces other crops or land uses, that in turn can encroach further on forest land.

Moreover, approximately three-quarters of the expansion of agriculture into forests is driven by domestic demand in producer countries, especially for beef and cereals. This suggests that the potential for international supply chain measures to help reduce tropical deforestation is more likely to be achieved through interventions in deforestation risk areas that focus on strengthening sustainable rural development and territorial governance. It also points to the importance of understanding supply chains to better target interventions.

2.3.2 Forest Fire

Often tied to agricultural practises and forest clearance, forest fires were responsible for between 29 and 37 percent of global forest loss between 2003 and 2018.²⁹ Some 90 percent of forest fires are deliberately started as a cheap way to clear land. Agriculture-driven deforestation is the cause as well as the effect of many large-scale fires. Climate change and increasing drought conditions are also increasing the incidence of forest fires.

²³ Martin Russell. 2020. *Forests in south-east Asia Can they be saved?* Briefing. European Parliamentary Research Service. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/652068/EPRS_BRI\(2020\)652068_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/652068/EPRS_BRI(2020)652068_EN.pdf)

²⁴ FAO. 2022. *The State of the World's Forests*. <https://www.fao.org/3/cb9360en/online/cb9360en.html>

²⁵ Pendrill, F. et al. 2022. Disentangling the numbers behind agriculture-driven tropical deforestation. *Science*. 377 (6611).

²⁶ FAO. 2015. *Sustainable-agriculture*. Food and Agricultural Organization of United Nations (FAO). <https://www.fao.org/sustainability/en/>

²⁷ FAO. 2022. *Agriculture: towards 2015/30*. <https://www.fao.org/3/y3557e/y3557e02.htm> (accessed February 2022).

²⁸ UNEP & Clean Air Coalition. 2021. *Global Methane Assessment: Benefits and costs of mitigating methane emissions*. Nairobi, United Nations Environment Programme.

²⁹ FAO. 2022. *The State of the World's Forests*. <https://www.fao.org/3/cb9360en/online/cb9360en.html>

2.3.3 Infrastructure

Infrastructure facilitates commodity extraction and agricultural expansion and directly causes deforestation and forest degradation by replacing forest or improving access to forest resources and facilitating land use change. In some cases, the legal and institutional reforms necessary to promote investment in infrastructure, often as a critical component of extractive industries, can erode established forest protections. Roads are intertwined with economic growth and habitat degradation. They can increase illegal logging and hunting, encroachment, and biodiversity loss through habitat fragmentation, discouraging movement within a population's range, and hindering gene flow between populations.

Behind such proximate causes are underlying drivers that tend to reflect national and global economic and political forces, and which may change over time.

2.3.4 Population Growth

Population growth, or more significantly population density, can drive deforestation in a variety of ways. Increases in demand for food at both a national or international level will increase the demand for agricultural land and commodities. Improvements to infrastructure and access to forest land can encourage movements of rural populations who may convert forestlands into croplands. However, the impact is not uniform across time and place. Population densities and the proximities of populations to forest areas varies. Leblois et al. (2017), for example, argue that heterogenous population densities mean that population is not a major driver of deforestation in much of Asia.³⁰ Similarly, whilst demographic growth can lower agricultural wages and stimulate expansion into agricultural and forested areas economic growth can stimulate population movements to urban centres, and lower the opportunity costs of unsustainable landscape practises.

2.3.5 International Trade

As countries' trade regimes become more open so does exposure to global commodity markets and the incentive to expand commodity and agricultural production. During 2000 to 2015 commodity-crop expansion was by far the single largest driver of deforestation in SE Asia.^{31,32} Rubber, palm oil, pulpwood (Acacia and Eucalyptus spp.), coffee and orchard (fruit and nut) crops, herbaceous and cereal crops are the dominant crop types on previously forested lands. Exports of those crops had increased substantially in all countries during that period. Seven percent of global deforestation is attributed to palm oil, of which three quarters of total production enters international trade.

2.3.6 Climate Change

Climate change is often cited as a driver of deforestation, although the relationship between climate change and deforestation is a complex one. Climate change has been shown to affect the resilience of forests and accelerate degradation as well as increase the risk of fire. At a local and regional level loss of forests can affect temperatures and rainfall impacting agriculture. Loss of forestland can also increase the likelihood of floods and degrade soils with intensification of extreme climate related events.

2.3.7 Institutions and Economic Development

³⁰ Leblois et al. 2016. What has Driven Deforestation in Developing Countries Since the 2000s? Evidence from New Remote-Sensing Data, *World Development*. 92. pp. 82-102.

³¹ Tenneson, K., Patterson, M.S., Jadin, J., Rosenstock, T., Mulia, R., Kim, J., Quyen, N., Poortinga, A., Nguyen, M.P., Bogle, S., Dilger, J., Marlay, S., Nguyen, Q.T., Chishtie, F., and D. Saah. 2021. *Commodity-Driven Forest Loss: A Study of Southeast Asia*. <https://servir.adpc.net/sites/default/files/public/publications/attachments/Commodity%20Driven%20Forest%20Loss%20Study%20SE%20Asia%20-%20full%20report.pdf>

³² Faria et al. 2016. Relationship between openness to trade and deforestation: Empirical evidence from the Brazilian Amazon, *Ecological Economics*. 121. pp 86-97.

Institutions underpin efforts to protect and exploit landscapes and have long been thought to affect the rate and nature of deforestation. However, the relationship is complex and depends on time, place and the nature of the study. Institutional quality and the prevalence of corruption and poor management can lead to deforestation, often because of insecure tenure and property rights. However, the relationship depends on the indicator employed. Countries such as Vietnam, for example, score poorly on some institutional proxies but perform relatively well in reforestation efforts. In other countries, there is evidence that corruption and high tenure costs can encourage landowners and even squatters to turn forest land to agricultural land to secure or increase the likelihood of securing property rights.

Governance, funding, regulations and well-resourced forest management plays a critical role in the protection of forests and the implementation of forest restoration programmes. Governance and the broader institutional framework within which the business models discussed in this paper sit go a long way to determining their success, and indeed the optimal choice of model.

The quality of institutions is closely linked to the level of economic development, which is also considered to be one of the more significant underlying drivers of deforestation. The "forest transition hypothesis"³³, for example, suggests that forest cover increases as countries get richer. In some respects, this is to be expected as countries with a large proportion of agricultural land, and so with a history of deforestation, will have less forest to exploit. Such countries also tend to have larger urban populations, and a higher opportunity cost of forest exploitation. Richer countries also have stronger property rights regimes and the institutional capacity to manage deforestation and degradation.

Understanding the proximate and underlying drivers of deforestation helps to provide context to efforts to encourage private sector involvement in sustainable landscape management. The importance of forces such as economic growth, population pressures and trade regimes, and the corresponding pressures on governments to facilitate and allow encroachment onto forest land points to the challenges inherent in building a comprehensive and aligned policy regime. Agricultural, industrial, infrastructure and socio-economic policy may all to some degree undermine environmental sustainability policies. One the most significant barriers many countries face to encouraging sustainable business practises are the sets of incentives private actors face, whether firms, large farms or smallholders. Similarly, where institutions are weak, contested or geared to competing objectives policy can be hard to implement.

³³ Mather, A. S., and C. L. Needle. 1998. The forest transition: a theoretical basis. *Area*. 30 (2). pp. 117-124.

3 The Importance of Sustainable Land and Forest Landscapes

3.1 Introduction

Forest landscapes play a critical role in economic development and ecological sustainability. As carbon sinks forests reduce the rate at which carbon builds up in the atmosphere. In the last twenty years forests have removed an estimated two billion metric tons of carbon from the atmosphere.³⁴ Tackling deforestation and forest degradation can be one of the most cost-efficient ways of mitigating climate change.³⁵ Terrestrial and aquatic ecosystems also produce goods and services for communities that can provide very real economic returns. Ecosystem services provide benefits of an estimated \$125-140 trillion per year, more than one and a half times the size of global gross domestic product (GDP).

3.2 Ecosystem Goods

Ecosystem goods are organised into four main categories: soil, water, air and biodiversity. The availability of ecosystem goods varies according to factors such as latitude, altitude, climate, biomes as well as the level of landscape degradation. Ecosystem goods include food (fruit, nuts, vegetables, grains, fish, and meat), water, timber, fuels, and products developed from raw materials. Ecosystem goods contribute to the economy and resilience of local enterprises, as well as local communities. For instance, fish provide inland fishing households in Cambodia with more fifty percent of their income.³⁶

Timber and pulp and paper are two particularly significant ecosystem goods on international markets. Firewood and charcoal are also important for national and local economies. Agroforestry products and non-timber forest products (NTFPs) include fruits from trees and palms, nuts, cocoa, and shade-grown coffee. New industrial processes have given many innovative products based on wood, for construction and decoration.

At current rates of deforestation and degradation ecosystem goods will decline, with significant implications for some countries. Johnson et al. (2021), for example, estimate that the output of goods that rely directly on ecosystem services could drop by eight percent (\$602 billion) by 2030.³⁷ In Southeast Asia, the Philippines is projected to experience the greatest loss in output (-18 percent or \$12.2 billion) followed by Vietnam (-16 percent or \$10.9 billion).

3.3 Ecosystem Services

Ecosystem services are non-tangible products derived from ecosystems. They include biogeochemical cycles (carbon, nitrogen, phosphorus) and water cycles, natural pest control, pollination, seed dispersal, decomposition, erosion prevention, improvement of soil fertility, soil formation and climate regulation.

The benefits of ecosystem services are substantial, ranging from the quality of air and water to agricultural output to protection from natural disasters such as flooding. Forests absorb rainwater, reducing run-off and damage from flooding. They reduce soil erosion and the incidence of landslides. By releasing water in the dry season, forests also help provide clean water and mitigate the effects of droughts. Mangrove forests and forested watersheds protect populations from disasters such as cyclones and tsunamis. Without healthy and well-maintained coastal ecosystems human suffering and loss of life from natural and man-made disasters can be substantial. From 1970 to 2019, 3,454 disasters were recorded in Asia, with 975,622 lives lost and \$1.2 trillion in reported economic

³⁴ Harris, N.L. et al. 2021. Global maps of twenty-first century forest carbon fluxes. *Nature Climate Change*. 11. pp. 234–240.

³⁵ Norheim. 2017. Mitigation and adaptation to climate change through sustainable rainforest management. *Research & Reviews: Journal of Ecology and Environmental Sciences*. 5-1.

³⁶ FAO. 2018. *The state of world fisheries and aquaculture*. Paper prepared for the Meeting on the Sustainable Development Goals, FAO, Rome.

³⁷ Johnson, et al. 2021. *The Economic Case for Nature: A Global Earth-Economy Model to Assess Development Policy Pathways*. World Bank, Washington, DC.

damages. This accounts for 31 percent of global weather-, climate- and water-related disasters, 47 percent of the deaths and 31 percent of estimated economic losses.³⁸

Ecosystem services are essential to many private businesses. For instance, pollination by bees, other insects, and bats is fundamental to agricultural production, valued at over \$34 billion to the US economy alone in 2012.³⁹ In a business-as-usual scenario by 2050, the loss in area of mangroves in Southeast Asia and of two ecosystem services: coastal protection and habitat/nursery support for fisheries would reduce the value of foregone benefits by US\$ 2.2 billion annually.⁴⁰

In 2020, the World Bank found that the net present value of the services that forests in Cambodia's Pursat River Basin provide to irrigation and hydroelectric power is at least US\$46 million dollars. The net value of ecotourism benefits generated by the forests is estimated at about US\$53 million. The value of the stock of carbon stored in the forests is US\$1 billion. The study concluded that investing in the maintenance of forest is good business. Annual public expenses to maintain the forest in the Pursat Basin are about 20 times lower than the public benefits provided by them and funding for maintenance can be captured from private and international sources.⁴¹

Loss of ecosystems services can impose large costs on agriculture. For example, the impact of pesticides on insect population can reduce agricultural productivity. In coffee plantations in Northern Thailand, systemic pesticides, in particular neonicotinoids, are especially damaging because they act within the whole plant making it and its pollen toxic to insects.⁴² Organic forest coffee growers there learned how to restore local ecological health by providing habitat for pollinators.

The provision of clean water from watersheds is essential for drinking, irrigation, industrial production, and energy. Water with low sediment content, a function of the health of the broader watershed ecosystem, is important for hydro-energy power plants, as sediment can affect turbines, reducing the number of years the plants can be effectively operated. There is often competition between different users due to volume consumed and the impact on water quality further down in the watershed. The records of sediment load for many Asian rivers are initially characterized by increases in response to land clearance and catchment disturbance, but subsequently decline in response to dam construction for improved water supply and hydropower generation.⁴³

Collapse in select ecosystems services such as wild pollination, provision of food from marine fisheries and timber from native forests could result in a decline in global GDP of \$2.7 trillion by 2030.⁴⁴ Relative impacts are expected to be most pronounced in low-income and lower-middle income countries, where GDP may fall more than ten percent by 2030.

Ecosystems also provide non-material benefits to local communities, many of which can also be exploited for monetary gain. Ecosystems can provide opportunities for recreation and ecotourism. Ecosystems can also have spiritual and cultural significance for many communities, as well as historical significance.

³⁸ WMO. 2021. *Weather-related disasters increase over past 50 years, causing more damage but fewer deaths.* <https://public.wmo.int/en/media/press-release/weather-related-disasters-increase-over-past-50-years-causing-more-damage-fewer>.

³⁹ Jordan, A., Patch, H.M., Grozinger, C.M., & Khanna, V. 2021. Economic Dependence and Vulnerability of United States Agricultural Sector on Insect-Mediated Pollination Service. *Environmental Science & Technology*. 55 (4). pp. 2243–2253.

⁴⁰ *The ASEAN TEEB Scoping Study: Valuing ecosystem services in Southeast Asia.* <http://lukebrander.com/wp-content/uploads/2013/07/ASEAN-TEEB-Scoping-Study-Flyer.pdf>

⁴¹ Rawlins, Maurice, Stefano Pagiola, Kashif Shaad, Mahbulul Alam, Rosimeiry Portela, Srabani Roy, Derek Vollmer and Werner Kornel. 2020. *Valuing the Ecosystem Services provided by Forests in Pursat Basin, Cambodia.* World Bank. Washington D.C.

⁴² Commons M.B. 2019. *Pollinators in Peril, Our Food System in Crisis, and the Potential for Restoration.* Heinrich Böll Stiftung Southeast Asia. <https://th.boell.org/en/2019/05/03/pollinators-peril-our-food-system-crisis-and-potential-restoration>

⁴³ Walling, D.E. 2009. Human impact on the sediment loads of Asian rivers. In: *Sediment Problems and Sediment Management in Asian River Basins.* Proceedings of Workshop at Hyderabad, India. *Geography, College of Life and Environmental Sciences, University of Exeter, Exeter EX4 4RJ, UK*

⁴⁴ Johnson, et al. 2021. *The Economic Case for Nature: A Global Earth-Economy Model to Assess Development Policy Pathways.* World Bank, Washington, DC.

4 Business Models for Sustainable Forest and Land Management

The value of the goods and services forests can provide coupled with their capacity to mitigate the impacts of climate change suggests that encouraging private sector participation in their maintenance is a potentially profitable endeavour. However, the pressures on landscapes to be exploited for alternate uses that often provide more immediate returns are significant. Moreover, the level of governance and the capacity of those working with forests mean implementing initiatives to encourage the take-up of sustainable business models is particularly challenging.

This section sets out the challenges facing policy makers, then provides a selection of business opportunities before describing tools and approaches that can be adopted to establish a broader framework to facilitate and encourage the pursuit of sustainable business models.

4.1 Challenges

Implementing or encouraging the take up of new business models for landscape restoration depends on the capacity of promoting agencies, the macroeconomy and the broader *enabling environment* including a bundle of *incentives* and *disincentives* facing private actors.⁴⁵

At the most fundamental level success will depend on the value of the initiative to those undertaking it compared to the next best opportunity. Success is more likely when opportunity costs of the new business model are low. This might depend on the existing level of development in a landscape, which may dictate the costs of further deforestation or restoration, the returns to labour in other sectors and the capacity of local firms and workers. Where opportunity costs are high policies will need to focus on reducing both the costs of participating in any program, and the value of alternative activities to land users.

Business initiatives will be influenced by the wider policy and regulatory regime. In many countries land users face a complex policy mix, with limited cross-sectoral policy coordination. A country's economic and agricultural policies, infrastructure investments, exposure to international commodity trade are usually more powerful influences than environmental initiatives and policies. In some cases, policies may even actively work against each other.⁴⁶ Agricultural policy promoting intensification or expansion can obstruct sustainability policies. In Indonesia, for example, policies to promote palm oil development conflicted with reduced deforestation targets.⁴⁷ The effectiveness of environmental policies thus often hinges on the alignment of instruments across policy sectors with conflicting goals.

Even when aligned, policies might still work against each other. In many countries environmental policies are aligned with development goals, such as infrastructure provision and poverty reduction, implying potential trade-offs. Yet, new infrastructure might bring people closer to forests and increase unplanned and poorly controlled exploitation. Successful initiatives to improve the livelihoods of people working in and around forests, such as those discussed in this report, are likely to attract people and businesses to the area requiring protection – which implies the need for increasing parallel investment in effective enforcement of forest management protocols.

Setting the right incentives is integral to the success of business models. Payments for environmental services, subsidies, input provision, tax exemptions and certification can all work to encourage private actors to develop sustainable business models. On the other hand, tax regimes and other incentives can dilute the impact of initiatives to tackle deforestation, pointing to the importance of setting effective incentives, of which there are many potential tools to adopt. Fiscal incentives can be directly linked to third party certification. Tax rates can be targeted to individual tree species and locations

⁴⁵ Miller, D. et al (eds.). 2020. Forests, Trees and the Eradication of Poverty: Potential and Limitations. A Global Assessment Report. *IUFRO World Series*. 39.

⁴⁶ Newton P, Agrawal A, Wollenberg L. 2013. Enhancing the sustainability of commodity supply chains in tropical forest and agricultural landscapes. *Global Environmental Change*. 23. pp. 1761–1772.

⁴⁷ Newton P, Agrawal A, Wollenberg L. 2013. Enhancing the sustainability of commodity supply chains in tropical forest and agricultural landscapes. *Global Environmental Change*. 23. pp. 1761–1772.

(potentially proxied by transport costs) to reduce foresting in remote areas. Certain models and businesses, such as private plantations that meet certain criteria, can be made exempt to incentivise sustainable practises. Ensuring disincentives to participate such as taxes (eg. user fees), regulations and constraints on land use are removed might also be essential to the success of any initiative. It is necessary to ensure that any fiscal incentives offered have a direct and demonstratable link to sustainable forest management practises.⁴⁸

A supportive enabling environment usually requires a set of complementary policies such as land tenure reform and the formalisation of individual and community rights. Globally, it is estimated that indigenous peoples and local communities hold as much as 65 percent of the world's land area under customary systems, only a fraction of which are formally recognised by governments.⁴⁹ Moreover, globally indigenous peoples manage about 40 percent of protected areas and ecologically intact ecosystems, and an estimated 91 percent of indigenous and community land is in good or moderate ecological condition.⁵⁰ Formalisation of land tenure, and of rights to operate in forests can ensure improved access to credit and markets, and encourage productive investments, and potentially improve community welfare.⁵¹

Devolving rights and powers to local communities is more likely to produce positive results if set within broader enabling frameworks and accompanied by sufficient support to ensure compliance and capacity.⁵² In Cambodia, for example, the allocation of economic land concessions to agribusinesses without the agreement of local land users is at the root of many recurrent conflicts.⁵³ Initiatives to grant indigenous communities legal titles to traditional land have proved time consuming and complex, with successful local communities typically gaining the title to only a portion of claimed land, and often losing out to more powerful groups.⁵⁴

Whilst titling can improve incomes, encourage investment and so welfare, there is no guarantee that it will achieve deforestation aims without supporting initiatives. This, of course, goes both ways. Land tenure reform can be a pre-requisite for the successful implementation of initiatives such as REDD+ or PES programs. Yet, indigenous groups and local communities often lack the capacity to engage in programs to maintain forest quality⁵⁵, and will benefit from efforts to improve knowledge and understanding of the importance of healthy ecosystems as well as the capacity to work the forest sector. It is notable that many successful examples tend to benefit from the long-term support of government and NGOs.

4.1.1 Importance and Challenges of Integrated Solutions

Business models best work in combination with other interventions and need to be of sufficient scale and designed to minimise negative spill overs.⁵⁶ That the pressures on forest landscapes and on

⁴⁸ Karsenty, A. 2021. *Fiscal and non-fiscal incentives for sustainable forest management: synthesis of the lessons derived from case studies in Brazil, Cambodia, the Congo, Côte d'Ivoire, Myanmar, Peru, Thailand and Viet Nam*. ITTO Technical Series No. 48. International Tropical Timber Organization (ITTO), Yokohama, Japan.

⁴⁹ Miller, D. et al (eds.). 2020. *Forests, Trees and the Eradication of Poverty: Potential and Limitations*. A Global Assessment Report. *IUFRO World Series*. 39.

⁵⁰ FAO. 2022. *The State of the World's Forests*. <https://www.fao.org/3/cb9360en/online/cb9360en.html>

⁵¹ Miller, D. et al (eds.). 2020. *Forests, Trees and the Eradication of Poverty: Potential and Limitations*. A Global Assessment Report. *IUFRO World Series*. 39.

⁵² FAO. 2022. *The State of the World's Forests*. <https://www.fao.org/3/cb9360en/online/cb9360en.html>

⁵³ Karsenty, A. 2021. *Fiscal and non-fiscal incentives for sustainable forest management: synthesis of the lessons derived from case studies in Brazil, Cambodia, the Congo, Côte d'Ivoire, Myanmar, Peru, Thailand and Viet Nam*. ITTO Technical Series No. 48. International Tropical Timber Organization (ITTO), Yokohama, Japan.

⁵⁴ Danielle Keeton-Olsen. 2021. Cambodia puts its arduous titling process for Indigenous land up for review. *Mongabay Series: Land rights and extractives*. <https://news.mongabay.com/2021/04/cambodia-puts-its-arduous-titling-process-for-indigenous-land-up-for-review/>

⁵⁵ Newton P, Agrawal A, Wollenberg L. 2013. Enhancing the sustainability of commodity supply chains in tropical forest and agricultural landscapes. *Global Environmental Change*. 23. pp. 1761–1772.

⁵⁶ Miller, D. et al (eds.). 2020. *Forests, Trees and the Eradication of Poverty: Potential and Limitations*. A Global Assessment Report. *IUFRO World Series*. 39.

private sector programs varies so widely points to the need to tailor initiatives to place, sector and time, and is also a compelling argument for more *integrated solutions*.⁵⁷

Yet, although sectoral and siloed approaches have long been regarded as inadequate, more holistic approaches that incorporate diverse and potentially oppositional stakeholders are difficult to implement.⁵⁸ “Navigating” complex systems, and stakeholder networks at various spatial scales is time consuming and potentially costly. Engaging stakeholders in such a way as to ensure long time buy-in and ownership also takes time and deep knowledge of local dynamics.⁵⁹ Setting effective incentives to apply equally to all relevant groups can be challenging - what may work for one group may not for another.

This is not necessarily an argument for abandoning more integrated approaches. The evidence certainly points to the *absence* of integration as a barrier to the success of many initiatives. It is more an argument for developing a deep knowledge of a landscape, its stakeholders and institutional infrastructure, and where necessary potentially limiting ambition, at least in the short term.

It is essential that an appropriate level of analysis is conducted prior to any intervention. The analytical tools adopted, and depth of analysis will depend on the scale and type of intervention, however some form of risk analysis, institutional mapping, stakeholder consultation and cost benefit analysis will help to determine the likely constraints to be faced and the challenges to be overcome. Such analysis should pay close attention to the time-horizon and consider any trade-offs between short to medium term solutions which may not necessarily be optimal but may have a greater chance of success.

4.2 Business Opportunities in Sustainable Landscape Management

Forests and linked agro-ecological landscapes provide a range of sustainable opportunities to businesses capable of exploiting them. The opportunities identified in this section are by no means exhaustive, for after all, part of the rationale for encouraging private sector participation is innovation and the identification of new opportunities. Nevertheless, the following provides a selection of approaches that can enable businesses, large and small, to extract value from landscapes and at the same time work to achieve sustainability objectives.

4.2.1 Intensive Agriculture

An intuitive approach is to encourage more intensive land use, to improve the returns (yield and/or income) and relieve pressures on ecologically valuable land. Agricultural intensification might be a particularly attractive strategy where a weak enabling environment complicates more integrated approaches.

Land-use intensification can increase the productivity of land in a variety of ways, which can be categorised as technologically driven (through the adoption of new technology, new crop varieties or management practises) or market driven whereby farmers shift to higher value crops or more productive mix of inputs in response to market signals.⁶⁰ Increased access to markets through, say, new infrastructure can also drive intensification by reducing input and transaction costs or raising output prices.

The attractiveness of increased intensification depends on whether the outcome is expansion or increased profitability in existing plots. Evidence is mixed and suggests that outcomes are highly dependent on crop type, how demand responds to price changes, labour availability and access to

⁵⁷ Börner J. et al. 2015. *Mixing Carrots and Sticks to Conserve Forests in the Brazilian Amazon: A Spatial Probabilistic Modeling Approach*. PLoS ONE 10(2).

⁵⁸ Reed, J. et al. 2019. Engaging multiple stakeholders to reconcile climate, conservation and development objectives in tropical landscapes. *Biological Conservation*. 238.

⁵⁹ idem

⁶⁰ Rodriguez Garcia, V. et al. 2020. Agricultural intensification and land use change: assessing country-level induced intensification, land sparing and rebound effect. *Environmental Research Letters*. 55.

markets.⁶¹ The success of intensification as a deliberate policy to relieve pressure on landscapes appears to also depend on institutional constraints on land-use expansion such as policy, tenure and rules of access⁶², particularly where forestland is readily available and poorly governed.⁶³ There is also evidence that more intensive practises can have undesirable impacts on the quality of soil and landscape, and, where farmers confront higher capital costs, on household's financial security. Nevertheless, as with all approaches discussed here increasing the intensity of agricultural land can, if certain conditions are met, relieve pressure on sensitive and ecologically valuable landscape.

4.2.2 Using Wood as An Energy Source and Building Materials

The forestry sector can play an important role in energy production. Dendro-energy - wood-based power plants – have proven to be an important renewable alternative. In the past, Dendro-energy plants had to be large to be profitable. However, technology advances mean that plants can now be profitable at smaller scale and even in combination with other biofuels, such as agricultural waste to be profitable. Additionally, woodchips and bark waste can be considered an energy source for sawmills and other forest industries.

Prior to COVID-19 there was a steady growth in the world's forest industry sector, partly driven by a growing demand for raw materials. This in turn saw a gradual move from the use of pure hardwood and softwood to cheaper industrial wood products such as chipboard, plywood and cross-laminated timber, which all play a role in sequestering carbon. Chipboards are often coated with a thin layer of veneer from fine wood. Similarly, there is a growing demand for white wood that can be tinted any colour to appeal to different tastes. The tendency towards low-cost industrial wood-based material is one reason wood is still competitive with other materials such as plastic for furniture and the construction industry.

A relatively new product is cross-laminated timber (CLT) for house and building construction. It is stronger and cheaper than traditional building materials such as concrete, brick and steel, is more energy efficient and creates a healthier indoor climate. CLT combines recycled plastic with wood fibre to produce a highly durable material that can be used for a wide range of products such as water pipes. The low cost of inputs ensures CLT is competitive.

4.2.3 Pulp and Paper

Pulp & paper are still important industrial forest products, and despite the rise in information technology the use of paper continues to grow worldwide. In Asia, the pulp and paper industry has a very poor environmental record and has done little to address pollution, land degradation and social impacts. Commitments to forest landscape rehabilitation have not been met and there remains limited effective engagement of major pulp and paper companies with the Forest Stewardship Council (FSC). Modern technology can reduce effluents in new plants but addressing the impacts on forests and communities requires fundamental reforms within the private sector and strong government incentives linked to sourcing and restoration of forests.

4.2.4 Agroforestry

Agroforestry can be practiced in both a farm-setting and in forests. On farms, trees and shrubs are used as windbreaks, fruit production, as soil improvement measures (especially leguminous species), and as soil and water stabilizing protection along contour lines. Trees give shade and fodder to livestock, and landscape beautification planted in villages and close to the houses. Agroforestry can also support biodiversity conservation through mixed native species planting creating habitat and wildlife corridors.

⁶¹ Rodriguez Garcia, V. et al. 2020. Agricultural intensification and land use change: assessing country-level induced intensification, land sparing and rebound effect. *Environmental Research Letters*. 55.

⁶² Meyfroidt et al. 2018. Middle-range theories of land system change. *Global Environmental Change*. 53 (1). pp. 52-67.

⁶³ Byerlee, D. 2014. Does intensification slow crop land expansion or encourage deforestation? *Global Food Security*. 3 (2). pp. 92-98.

Agroforestry can make the agricultural commodity sector more environmentally sustainable and productive. Practices include, for example, shade-grown coffee, cocoa and tea; silvo-pastoral systems; organic production; use of organic fertilizers, compost, mulch and worm culture; efficient water management; and soil conservation through contour cultivation, live barriers and minimum tillage. Part of this approach is the reduction in use of agrochemicals, providing economic, environmental and health benefits.

International markets have been increasingly interested in rainforest non-timber forest products from a sustainability perspective but also for a healthy diet. Such products include nuts, natural oils, palm heart, and fruits such as breadfruit and breadnut, elephant apple, wampee and durian.

4.2.5 Ecotourism

Ecotourism is one of the more effective models to attract local funding to protected areas and conservation efforts and is especially suitable for micro and small enterprises. The United Nations World Tourism Organization (UNWTO)⁶⁴ defines ecotourism as nature-based forms of tourism where the observation and appreciation of nature and traditional culture in natural areas is the main motivation for traveling, and where ecotourism has the following specific characteristics:

- Contains educational and interpretation features;
- Tours are organized by specialized, small-group tour operators;
- Destination partners are usually small, locally owned businesses;
- Minimizes negative impacts on the natural and cultural environment; and
- Supports the maintenance of areas used as ecotourism attractions.

Eco-tourism can be organised into three levels according to the quality and price of the product:

- *Backpacker eco-tourism* has a low environmental impact, but also presents limited socioeconomic opportunities for the local population;
- *Mass eco-tourism* can provide high incomes for a country but can also have significant negative impacts on biodiversity and local population; and
- *High-level eco-tourism* which, if well planned, attracts few tourists at high prices and has low environmental and social impacts.

To ensure ecotourism does not have negative impacts on protected areas it is necessary to develop management plans, which define core biodiversity areas that are not accessible to the public, as well as other zones with well-defined safeguards, including buffer zones.

Community-based tourism can also be a viable model, although success depends on the quality of management, access to finance and the capacity to avoid internal conflict over participation and benefits. Environmental NGOs are often involved in supporting communities, however, if their presence is not long-term projects may not be sustainable. A more efficient model may well be community-based micro enterprises, in which people in the community participate (often with a cooperative model) and hire a skilled manager to take care of financing, marketing, and operations.

4.2.6 Plantations

Plantations are typically easier to manage and have a better economic return (lower costs, and higher benefits) than the exploitation of natural forests. This is not an argument for converting natural forests to plantations, as in many countries there are large areas available in previously deforested and degraded land.

Plantation forestry can also take a more central role in biodiversity restoration and climate change adaptation. Most plantations in Asia are monocultures with little or no consideration for biodiversity and wider ecosystem benefits, and often lead to a worsening of watershed conditions for significant short-term gains.

⁶⁴ UNWTO. 2021. *Ecotourism and Protected Areas*. <https://www.unwto.org/sustainable-development/ecotourism-and-protected-areas>

Increased research, trials and demonstration areas can be dedicated to improving diversity without reducing profitability. These measures include protection of native vegetation close to rivers, lakes and swamps, establishing and maintaining wildlife corridors of native species, and planting more variety of native forest species within the plantation.

4.2.7 Improving the Productivity of Forestry

There are increasing technologies, techniques, and products available to improve the productivity of natural and plantation forest land. Genetic research can improve the efficiency of reforestation and general forest planting. While traditionally genetic research focused on improved seeds, it is now concentrated on vegetative propagation of clones, including grafting, stumps, rooting of shoot and branch cuttings, coppicing, organogenesis, and somatic embryogenesis. Several of these methods include in vitro propagation. These advances can lead to efficiencies and enhanced productivity in forest management for the private sector. Research results are made accessible through the International Union of Forest Research Organizations (IUFRO).

4.2.8 Selection Forest Systems

In northern Europe there has been a steady move away from clear-cutting of forest stands towards selection forest systems that maintain areas more like a natural forest. Over time even monoculture plantations can be managed on this basis to allow for the development of more diverse and stable forests. This requires good silvicultural knowledge and practice and should be consistent with the natural succession of local ecosystems. There is significant scope for developing the approach further in Asia. Similarly, *selective logging and reduced impact logging* have long been promoted in subtropical and tropical regions but with limited attention to biodiversity.

4.2.9 Conservation Agriculture

Conservation Agriculture “is a farming system that can prevent losses of arable land while regenerating degraded lands”.⁶⁵ It promotes the maintenance of a permanent soil cover, minimum soil disturbance, and diversification of plant species. Permaculture, a form of conservation agriculture, is “the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems”.⁶⁶

Conservation Agriculture has the potential to improve crop productivity with increased water-, energy-, and nutrient-use efficiencies, and higher economic returns. However, there are challenges for farmers, even in suitable climates. For instance, higher weed occurrence is cited as a barrier for small holders who lack the resources and time to apply herbicides. More broadly farmers require training in Conservation Agriculture practises, finance to facilitate increased scale and the capacity to bear the risks of adopting new techniques.⁶⁷ Conservation Agriculture programs will also likely need adjustments to local institutions to ensure the availability of skills providers, mentoring equipment manufacturers, and seeds for cover crops.⁶⁸

4.3 Business Models to Encourage Private Sector Participation

There are several models governments can adopt to provide incentives and financing for businesses to exploit commercial opportunities that go some way to supporting environmental objectives. They will vary according to context and the pressures on individual landscapes. Strategies with climate change adaptation at their heart, for instance, may differ substantially from more conventional sustainability strategies, however, there is no intrinsic reason why the models described here cannot be deployed for a range of purposes. Ultimately the strategy and the model will need to be tailored to

⁶⁵FAO. What is Conservation Agriculture? [https://www.fao.org/conservation-agriculture/overview/what-is-conservation-agriculture/en/#:~:text=Conservation%20Agriculture%20\(CA\)%20is%20a,and%20diversification%20of%20plant%20species.](https://www.fao.org/conservation-agriculture/overview/what-is-conservation-agriculture/en/#:~:text=Conservation%20Agriculture%20(CA)%20is%20a,and%20diversification%20of%20plant%20species.)

⁶⁶ Mollison, B. 1997. Permaculture: A Designer’s Manual. *Ten Speed Press*. 576 pp.

⁶⁷ Shikha Thapa Magar. et. al. 2022. Conservation agriculture for increasing productivity, profitability and water productivity in rice-wheat system of the Eastern Gangetic Plain. *Environmental Challenges*. 7.

⁶⁸ Lienhard, P. 2014. Profitability and opportunity of conservation agriculture in acid savannah grasslands of Laos. *International Journal of Agricultural Sustainability*. 12 (4). pp. 391-406.

the requirements and constraints of the landscape in question, and be aligned with relevant policies and institutions.

4.3.1 Use of REDD+ to Incentivise Actors

“Reduced Emissions from Deforestation and Forest Degradation” (REDD+) is a climate change mitigation solution recognized in Article 5 of the Paris Agreement, developed by parties to the United Nations Framework Convention on Climate Change (UNFCCC).

REDD+ goes beyond reducing emissions from deforestation and forest degradation (REDD), to include actions for the conservation, sustainable management of forests and enhancement of forest carbon stocks. The framework is commonly referred to as the Warsaw Framework for REDD+ (WFR) adopted at COP 19 2013 and provides a complete methodological and financing guidance for the implementation of REDD+ activities.

REDD+ can provide a useful framework for governments to manage programs to tackle deforestation and is also a potential source of funds to subsidise efforts to tackle deforestation. Indeed, for governments to be eligible for credits they must create a National REDD+ strategy and demonstrate a national forest monitoring system among other requirements.

Yet, progress can be slow. It takes time to develop a strategy and meet the conditions for REDD+. Even then it will take time to demonstrate success. Norway, for example, did not pay Indonesia the funds agreed as part of a REDD+ agreement in 2019, partly a result of the challenges putting together a MRV system and partly because of political factors.^{69,70}

Whilst REDD+ can be time consuming and costly it can set the foundations and framework for successful policies. There is some evidence, for example, that many countries have improved forest monitoring in response to the requirements of REDD+, which in turn can lead to improved governance.⁷¹ Moreover, it is hard for governments to implement successful policies if broader policy and institutions are not aligned, and an integrated strategy is not in place.

Example: REDD+ facilitates sale of carbon credits in Cambodia

Cambodia has a National REDD+ Programme and completed its REDD+ readiness phase. The National REDD+ Strategy 2017-2026 (Royal Government of Cambodia 2017) creates incentives to protect, better manage and wisely use forest resources. According to the Strategy, the institutional framework for REDD+ will enable Cambodia to report its GHG emissions from the LULUCF sector to provide a technical annex to the Biennial Update Report (BUR) to be submitted to the UNFCCC as part of the process to request results-based payments. However, even before Cambodia was “REDD ready” the country was able to sell carbon credits of more than \$11 million since 2016. The carbon credits sold to date are from the Keo Seima Wildlife Sanctuary (KSWs), Phnom Kravanh, the Prey Lang forest and Koh Kong’s Tatai area. Prey Lang Wildlife Sanctuary is the most extensive lowland evergreen forest remaining in mainland Southeast Asia and Cambodia’s largest protected area. Despite the carbon credit benefits, in 2021, Amnesty International reported that over 9,000 hectares of forest in Prey Lang was lost during 2020 – 20 percent more than in 2019.⁷²

⁶⁹ Mongabay. 2022. *Indonesia and Norway give REDD+ deal another go after earlier breakup.* https://news.mongabay.com/2022/09/indonesia-and-norway-give-redd-deal-another-go-after-earlier-breakup/?utm_source=twitter&utm_medium=globalforests&utm_campaign=socialmedia&utm_term=875f5c91-b174-4a21-9994-68c33fba140f

⁷⁰ Mongabay. 2020. *Indonesia to receive \$56m payment from Norway for reducing deforestation.*

<https://news.mongabay.com/2020/05/indonesia-norway-redd-payment-deforestation-carbon-emission-climate-change/>

⁷¹ Mst Karimon Nisha et. Al. 2021. An assessment of data sources, data quality and changes in national forest monitoring capacities in the Global Forest Resources Assessment 2005–2020. *Environmental Research Letters*. 16 (5).

⁷² Amnesty International. 2021. *Cambodia’s Prey Lang: how not to protect a vital forest.*

<https://www.amnesty.org/en/latest/news/2021/04/cambodias-prey-lang-how-not-to-protect-a-vital-forest/>

The Keo Seima REDD+ project is the largest carbon emission reduction program in Cambodia's land use sector. It has an essential role in demonstrating REDD+ benefits in conserving high biodiversity value landscapes. The project protects primary forests and habitats for Asia's most threatened species, including the rare Asian Elephant, Gibbons, and the Giant Ibis. KSWs protects 167,000 ha of dense forest and a 297,000ha buffer zone. This area is estimated to avoid 17.4 million tons of CO₂e emissions over 10 years.

Experiences from implementation of the project is providing important learning for Cambodia's National REDD+ Program.⁷³ In 2016, the Walt Disney Company bought \$2.6 million in carbon credits for KSWs, marking it the largest carbon credit sale in Cambodian history. The deal, which was only set to last until 2021, protected 165 ha of forest land in KSWs. Flynn (2021) reported that during a meeting June 23, 2021 between the Cambodian Minister of Environment Say Samal and the British Foreign Secretary Dominic Raab, the Minister proposed that the United Kingdom purchase carbon credits for KSWs.⁷⁴ Yet, serious illegal forest clearing and land grabbing in the Sanctuary continues much to concern of local communities wishing to maintain and grow ecotourism activities.⁷⁵

4.3.2 Value Chain Development

All enterprises are tied to markets via a series of backward and forward linkages. Value chains describe the business activities and processes involved in creating a product or performing a service. They encompass every stage from research and development to design to production, distribution and sales. Whilst single enterprises can encompass the entire value chain, more typically a value chain includes a string of firms, many of which may have no knowledge of each other.

Value chains are central to the development of any sustainable business model. Thinking in terms of value chains, the roles and responsibilities of each firm in the chain and the incentives they face demonstrates the importance of taking a more integrated or systems orientated approach to building sustainable models. It also exposes the difficulties policy makers face as many links in the chain may be large global corporations which operate outside the country.

There are three essential approaches to exploiting value chains to tackle deforestation:

- (i) encourage actors within value chains to undertake or contribute to forestry activities,
- (ii) strengthen the components of existing value chains to be more sustainable and,
- (iii) incorporate existing businesses into value chains in ways which increase understanding, skills and capacities for sustainable practices.

Encouraging more sustainable linkages within value chains is typically the role of certification, regulations, procurement and efforts to improve the enabling environment.

Strengthening value chains can take many forms. Value chain analysis can assess the capacity of actors within the chain, the linkages between them, and can look to identify new higher value products and other productivity enhancements, improve access to financing and improve skills and resources available to firms such as the introduction of e-commerce strategies and technologies.

Incorporating existing businesses often involves a similar approach. At the small holder level, it may require enabling firms to access value chains, by removing barriers and providing knowledge and capabilities. At a global level, campaigns, consumer pressure or regulations in consumer countries can encourage large actors to engage in more sustainable value chains. At the level of the individual enterprise a range of business models determine where and how enterprises, farmers and community

⁷³ Keo Seima Wildlife Sanctuary. 2021. *Keo Seima Wildlife Sanctuary*. <https://seimaredd.wcs.org/>

⁷⁴ Flynn, G. 2021. REDD projects still struggling to live up to expectations in Cambodia. *Cambodianess*. <https://cambodianess.com/article/redd-projects-still-struggling-to-live-up-to-expectations-in-cambodia> (accessed 6 July 2021).

⁷⁵ Khmer Times. 2021. *100 ha of land illegally cleared in Keo Seima Wildlife Sanctuary*. <https://www.khmertimeskh.com/50944346/100-ha-of-land-illegally-cleared-in-keo-seima-wildlife-sanctuary/> (accessed 30 September 2021).

groups might engage with value chains. These might include farmer organisations, agrifood processors, retailers, contract farming with larger buyers, and procurement models with the public sector.

Understanding the nature of the value chain is of critical importance. About three-quarters of the expansion of agriculture into forests is driven by domestic demand in producer countries, especially for beef and cereals. The potential for international supply chain measures to help reduce tropical deforestation needs to be explored – but understanding domestic value chains and influencing consumer demand in producer countries is an essential part of the story.⁷⁶ Initiatives to promote sustainability in value chains work best when they build on the knowledge of existing actors and incorporate them in the process. It is worth bearing in mind that up to half of cleared land is not used for productive agriculture, and so will not be managed by links in value chains.⁷⁷

Example: Enhancement of value chains for non-timber forest products in the Philippines

In the Philippines FAO is supporting value chain development for NTFPs with local project areas are situated in Luzon and Mindanao.⁷⁸ The selection of areas considered presence of forestry-based enterprises, cooperatives, and other value chain actors, giving priority to areas that already have high potential for entrepreneurship. Information is being exchanged with the main actors in the country's top agroforestry-based commodities and their value chains. The value chain actors achieve improved access to appropriate technologies for production and post-harvest practices, inputs, and markets combined with social protection systems.

The long-term project is focusing on several products:

- Coffee, cacao and rubber for Eastern Mindanao (potentially also Falcata⁷⁹ timber);
- Legalized fuel wood, green charcoal, cacao and bamboo for Pantabangan-Carranglan Watershed Forest Reserve.

Enhancement of value chains includes integration of agroforestry NTFPs such as bamboos and rattan, with agricultural crops. The project covers certified sustainable fuelwood and charcoal production, both important for livelihoods and revenue generation. The goal is to have communities gain higher revenues while reducing continuing degradation of natural and planted forests.

Localized Value Chain Analyses (VCAs) are being conducted for each commodity to ensure higher productivity and income in each phase of the value chain from seed production and land preparation, to processing, packaging and trading of the product. The VCAs are building on existing value chain studies conducted by the Philippine's Department of Trade and Industry (DTI) for the selected NTFP commodities.

Expected benefits from the project are increased incomes of households and people's organizations and technical, organizational and marketing support to develop livelihood activities from commodities under the National Greening Program (NGP). Strengthened local value chains will benefit other players, for example, input providers, processors, and buyers, across the chains.

The FAO project is collaborating with the KAPATID Project, which is an initiative of Department of Trade and Industry (DTI) and the Philippine Centre for Entrepreneurship (PCE) to help the country's micro and small enterprises through: (i) the Mentor ME (micro entrepreneurs) program - a coaching and mentoring approach where large corporations train MSMEs in various aspects of business operations; (ii) the Adopt-an-SSF (Shared Service Facility) program, which

⁷⁶ Pendrill, F. et al. 2022. Disentangling the numbers behind agriculture-driven tropical deforestation. *Science*. 377 (6611).

⁷⁷ idem

⁷⁸ FAO. 2019. *Enhancing biodiversity, maintaining ecosystem flows, enhancing carbon stocks through sustainable management of forests resources and the restoration of degraded forestlands*. Project document, Philippines.

⁷⁹ Falcata (*Paraserianthes falcataria*) is a fast-growing tree species, grown commercially in the Philippines.

aims to help micro entrepreneurs by providing them access to SSFs in their community; and (iii) the Inclusive Business (IB) model where MSEs are linked into large companies' value chains.⁸⁰

4.3.3 Certification of Sustainable Production

There are two basic forms of certification: certification of the legal origin of timber (chain-of custody certification) and the certification of sustainable forest management. International markets are beginning to demand sustainably produced goods. Many specialized markets require internationally recognized certification, such as Organic Production, Fair-trade, Forest Stewardship Council (FSC), UTZ sustainable farming, Rainforest Alliance (RA), and Roundtable for Sustainable Palm Oil. The merger of RA (headquarters US) and UTZ (headquarters the Netherlands) led to a stronger organization and broader operations. RA's certification arm RA-CERT has authorized certification firms in most countries in South-East Asia, including ten in Vietnam, three in Laos, four in the Philippines and one in Cambodia.

Forest Certification Bodies certify sustainable forest management. Forest management bodies that abide by certain principles and achieve certification hope to receive higher prices for timber and non-timber forest products and access to a broader range of potentially more affluent markets. Forest certification aims to create a market incentive for forest owners, managers and product buyers to abide by and support sustainable practises.⁸¹

The Forest Stewardship Council (FSC) is the leading certification body and was established in 1993, soon after the Rio Earth Summit. The FSC's mission is to promote environmentally appropriate, socially beneficial, and economically viable management of the world's forests. FSC has a strong relationship with the EU FLEGT facility, which certifies that forest products come from legal sources. FSC has developed ten principles (Box 4.1) and 70 criteria for sustainable forest management that are applied for forest certification, which is carried out by accredited firms and organizations. Companies are audited annually against the principles. Other organisations play a similar role to the FSC, including the Programme for the Endorsement of Forest Certification, which also has forest management certification and a chain of custody scheme, but differs in that it serves to endorse national forest certification systems.

Box 4.1: Forest Stewardship Council Principles

- 1. Compliance with laws:** The Organization shall comply with all applicable laws, regulations and nationally-ratified international treaties, conventions and agreements.
- 2. Workers' rights and employment conditions:** The Organization shall maintain or enhance the social and economic well-being of workers.
- 3. Indigenous peoples' rights:** The Organization shall identify and uphold indigenous peoples' legal and customary rights of ownership, use and management of land, territories and resources affected by management activities.
- 4. Community relations:** The Organization shall contribute to maintaining or enhancing the social and economic well-being of local communities.
- 5. Benefits from the forest:** The Organization shall efficiently manage the range of multiple products and services of the Management Unit to maintain or enhance long term economic viability and the range of environmental and social benefits.
- 6. Environmental values and impact:** The Organization shall maintain, conserve and/or restore ecosystem services and environmental values of the Management Unit, and shall avoid, repair or mitigate negative environmental impacts.
- 7. Management planning:** The Organization shall have a management plan consistent with its policies and objectives and proportionate to scale, intensity and risks of its management activities. The management plan shall be implemented and kept up to date based on monitoring information in order to promote adaptive

⁸⁰ Kapatid Mentor Me Project. <https://www.dti.gov.ph/negosyo/kapatid-mentor-me-project/>

⁸¹ Lewin, A. et al. 2019. Forest Certification: More Than a Market-Based Tool, Experiences from the Asia Pacific Region. *Sustainability*. 11 (2600). doi:10.3390/su11092600

management. The associated planning and procedural documentation shall be sufficient to guide staff, inform affected stakeholders and interested stakeholders and to justify management decisions.

8. Monitoring and assessment: The Organization shall demonstrate that progress towards achieving the management objectives, the impacts of management activities and the condition of the Management Unit, are monitored and evaluated proportionate to the scale, intensity and risk of management activities, in order to implement adaptive management.

9. High conservation values: The Organization shall maintain and/or enhance the high conservation values in the Management Unit through applying the precautionary approach.

10. Implementation of management activities: Management activities conducted by or for the Organization for the Management Unit shall be selected and implemented consistent with the Organization's economic, environmental and social policies and objectives, and in compliance with the Principles and Criteria collectively.

Source: www.fsc.org

The broader aims of certification are to promote sustainable timber production, enhanced social welfare, and environmental protection. Certification also intends to ensure access to higher product prices and to improve incomes and livelihoods of workers of certified companies. FSC itself claims that tropical forest timber carrying its label brings 15-25 percent more at auction.⁸²

Evidence that certification as an approach meets its objectives is mixed, although the paucity of rigorous evaluations means firm conclusions are hard to come by. A relatively recent survey of fifty studies that made over three hundred comparisons between certified and conventional logging organisations found that on balance certified logging was marginally superior.⁸³ In most cases companies received price premiums, but rarely at the level expected by forest managers. Prices also varied over time and by species, product and country. Direct costs and timber yields tended to be higher, lowering productivity.

Yet, social outcomes for workers and communities tended to be better. Workers often had access to better housing, health care and work contracts. Some studies suggested impacts weren't universally positive, and in some cases, communities were worse off, largely because they lost access to forests.

It was found that environmental outcomes were improved. Certified forests had more diverse plant and animal populations, less ground disturbance and lower logging intensities. Even so on some site leakage was a problem as conventional practises were pushed onto neighbouring forest land. Other studies confirm that certification reduces forest cover loss and air pollution, promotes higher carbon density in vegetation and increases the richness and diversity of animal species.^{84,85}

Certification is also a more suitable model for larger scale producers. Increased production costs and the costs of abiding by the principles tend to preclude smaller operations. Successful businesses also tend to require a higher level of management capacity. There is also evidence that there is limited demand for certified forest products in typical markets for firms in Southeast Asia.⁸⁶

Recognising these issues FSC runs a separate scheme for "Small and Low Intensity Managed Forests", which encourage smallholders to group together to reduce costs and offer more streamlined auditing processes. Up take has been relatively slow, and available evidence suggests

⁸² Burivalova, Z. 2016. A Critical Comparison of Conventional, Certified, and Community Management of Tropical Forests for Timber in Terms of Environmental, Economic, and Social Variables. *Conservation Letters*. 10 (1).

⁸³ idem

⁸⁴ Lewin, A. et al. 2019. Forest Certification: More Than a Market-Based Tool, Experiences from the Asia Pacific Region. *Sustainability*. 11 (2600). doi:10.3390/su11092600

⁸⁵ Sollmann, R., Mohamed, A., Niedballa, J., Bender, J., Ambu, L., Lagan, P., Mannan, S., Ong, R.C., Langner, A., Gardner, B., et al. 2017. Quantifying mammal biodiversity co-benefits in certified tropical forests. *Diversity and Distributions*. 23 (3). pp. 317–328.

⁸⁶ Lewin, A. et al. 2019. Forest Certification: More Than a Market-Based Tool, Experiences from the Asia Pacific Region. *Sustainability*. 11 (2600). doi:10.3390/su11092600

that extra returns rarely cover the added costs of certification.⁸⁷ Nevertheless, other studies suggest that when barriers can be overcome the non-financial returns (knowledge, market access, social recognition) coupled with the albeit small financial benefits can be motivation enough if outside bodies facilitate participation.⁸⁸

Most FSC certified forests are in Europe, North America and Latin America, possibly because of a larger population of smaller scale businesses in Asia, and particularly Southeast Asia. However, FSC activities in the Asia-Pacific region are increasing. Indonesia, Japan, Malaysia, South Korea and Vietnam have recently developed their own anti-illegal timber trade legislation where the FSC certificate is recognized as valid evidence of legality. Indonesia and Vietnam have also introduced regulations requiring due diligence from their importers, while Malaysia requires documentation of legality from importers.⁸⁹

Those are important developments for the national market and to help avoid these countries functioning as transit points for illegally logged timber. The national FSC standards in Indonesia entered into force in December 2020, and an Asia-Pacific Regional FSC Standard for Smallholders was launched and piloted from June 2021. FSC is in its infancy in Cambodia and the Philippines. To date Cambodia has only one FSC certified enterprise. In the Philippines, the Department of Environment and Natural Resources (DENR) is exploring an accreditation system for People's Organisations (POs) under the FSC certification system, recognising the importance of POs in forest management.⁹⁰ A program pilot accredited 20 POS in 2019-2021.

Despite the clear challenges to certification as a viable business model for low capacity, small holders in Southeast Asia, when combined with other approaches there is some evidence that the approach can be lucrative. FSC suggests linking products with the Fairtrade International logo, increasing the value of products by in-forest or near-forest processing, affixing FSC Small and Community Label options, and diversifying products.

As with most business models for ecological sustainability, evidence suggests that forest certification works best when aligned with government policy and other business models. In some instances, government regulation might need to be revised to ensure alignment with certification principles. The added costs and reduced productivity of certification, particularly for smallholders may imply government support to help to develop more sophisticated business models for example, by increasing the sophistication of products, integrating with value chains, or simply improving management capacity. In others, as in Vietnam, a small subsidy may be sufficient to ensure that certification is viable and may well be justified from a broader economic and policy perspective as it captures the environmental and social benefits.

Example: Certification of sustainable forestry in Indonesia

The Indonesian company P.T. Wapoga Mutiara Timber Unit II (WMT II) achieved FSC Controlled Wood certificate in 2016 and achieved full FSC Forest Management certification in 2018 as an FSC-compliant forest management concession. WMT II has been supported by The Borneo Initiative since 2011 and produces annually 55,000 m³ of mostly Merbau wood, which enabled its certification process. Technical assistance in the certification process was provided by The Forest Foundation. This partnership reflects the power of multi-party stakeholder engagement in contributing to responsible forest management.

This certificate means that FSC has added to its already expansive fold a forest concession of 167,923 ha in Indonesia's Sarmi district, Papua province. Indonesia has now more than 3.2 million

⁸⁷ Bulkan, J. 2020. *Smallholder Forestry in the FSC System: A Review, Revue Governance*.

https://www.researchgate.net/publication/347150802_Smallholder_Forestry_in_the_FSC_System_A_Review

⁸⁸ Apriani, E. et al. 2020. Non-state certification of smallholders for sustainable palm oil in Sumatra, Indonesia, *Land Use Policy*. 99. <https://www.cifor.org/knowledge/publication/7771>

⁸⁹ FSC. 2018. *Legislation to prevent illegal imports into Asian Countries*. Forest Stewardship Council briefing note.

⁹⁰ The Manila Times. 2022. *PH adopts forest stewardship system*.

<https://www.manilatimes.net/2022/05/14/business/green-industries/ph-adopts-forest-stewardship-system/1843578>

ha of FSC certified forests, which includes 24 natural production forests with FSC certification, covering 2.8 million ha. Additionally, the country has 8 forest plantations and 11 community groups with FSC certification.

Example: Abacá production in the Philippines

The Philippines produces 85 percent of the world's supply of abacá fibre, also called Manila hemp, extracted from the leaf-stems of a species of banana (*Musaceae*) native to the Philippines. The Catanduanes island accounts for 30 percent of the Philippine's entire production. The firm Glatfelter has worked in the Catanduanes mountains for over 20 years, organizing the farmers in regional groups under the Catanduanes Abacá Sustainability Initiative (CASI), to offer village trainings and social benefits.

Glatfelter CASI has achieved RA certification for sustainable production of abacá. The last certification Dec 2018 covered 238 producers, 605 ha, and an estimated production of 880 ton.⁹¹ Most producers have family farms, but there are also 78 workers. The abacá palm sends up multiple stalks from a central root to produce thick, fibrous leaves, and when it starts blooming it signals the farmers that the stalk is ready for harvest. Farmers cut the mature stalk and strip it of its leafy layers without harming the rest of the plant. In that way, abacá can generate a consistent, large volume of fibre for up to 20 years. In the 19th century, it was the preferred fibre for ship ropes due to the product's saltwater resistance and strength. Today it is becoming a more desired biodegradable material for tea bags and many fashion products.⁹²

4.3.4 Payments for Ecosystem Services

Payments for ecosystem services (PES) take place when beneficiaries and users of an ecosystem service make payments to the providers of the service, or more accurately payments to custodians of an ecosystem who ensure it continues to provide the service. PES is a strategy to address economic externalities of resource use and extraction, ensuring users of services pay for its maintenance. Typically, PES programs are associated with carbon sequestration and storage, biodiversity protection, watershed protection and landscape beauty.

PES can be a suitable solution to the problem of accounting for externalities but establishing effective programs can be complex, costly and dependent on several prerequisite factors. Careful program design is required to ensure PES programs identify and account for efficiency and equity trade-offs, monitoring costs, the rightful allocation of rights and responsibilities and sufficient stakeholder buy-in.⁹³ Moreover, to be effective PES requires funding over the long term-term, and payments may need to include investment, training, income protection, and the development of value chains and markets. Where government is the key source of funding it may also be necessary to protect programs from annual budget decisions and diversify access to international funding streams.

Example: National PES program in Vietnam

Vietnam is more advanced than other countries in the region in establishing a national PES system. In April 2008, the Government of Vietnam approved a national policy regarding payment for forest environmental services (PFES), to develop a legal framework that can be applied nationwide with clear definition of rights, duties, obligations and accountability of service providers and beneficiaries. The purpose was to create a sustainable economic base for forest protection and development, as well as for environmental and ecosystem protection. The policy established the framework conditions for two regional pilot initiatives in Son La and Lam Dong provinces in Vietnam's north-west and south-east regions.

⁹¹ Rainforest Alliance. 2022. <https://www.rainforest-alliance.org>

⁹² Traditional Medicines. 2022. *What's in your cup 2022?* <https://www.traditionalmedicinals.com/articles/tea/whats-in-your-cup/>

⁹³ Kai M.A. Chan. 2017. Payments for Ecosystem Services: Rife with Problems and Potential—For Transformation Towards Sustainability. *Ecological Economics*. 140. pp. 110-122

Based on these experiences, Decree No. 99 on Payment for PFES was approved for national implementation in 2010.⁹⁴ The Decree promulgates types of forest environmental services (FES) that users of the services must pay to forest owners:

- Soil protection, reduction of erosion and sedimentation of reservoirs and rivers' beds;
- Regulation and maintenance of water sources for production and society's needs;
- Carbon sequestration;
- Protection of natural landscape of ecosystems to serve ecotourism; and
- Provision of spawning ground, sources of feeds, and young for aquaculture.

The users of the FES include (i) hydropower plants, to pay for reduction of erosion and sedimentation of reservoirs and rivers' beds; as well as regulation and maintenance of water sources for hydropower production; (ii) water supply plants, to pay for maintenance of clean water sources; (iii) tourism organizations/firms and individuals, to pay for forest for natural landscapes of forest ecosystems; (iv) industrial production businesses using water for production, to pay for regulation and maintenance of water sources; (v) businesses trading and practicing aquaculture based on mangroves, to pay for forest supply of spawning grounds, sources of feeds, and natural young for aquaculture; (vi) businesses trading and producing products with carbon emissions that GHG effects, to pay for forest carbon sequestration; and (vii) foreign organizations and individuals that purchase service of forest carbon sequestration based on agreements and commitments with Vietnam.

The main groups of FES suppliers entitled to payment are the forest owners, including: (i) government organizations contracting out long-term forest concessions; (ii) owners of forests created by them on allocated land; and (iii) households and individuals on allocated forest. Payment modalities include direct negotiation and payment from the user to the supplier of FES or indirect payment through the Forest Protection and Development Fund (FPDF). From 2008 to 2016, 42 out of 63 provinces established Provincial Forest Protection and Development Funds for more than 100,000 forest service providers who protect 3.3 million hectares or 27 percent of the total forested area.⁹⁵

Decree 2010 made Vietnam the first country to establish a nationwide policy on PFES. Already in 2012 MARD had collected \$60 million from more than 80 hydropower, water supply and ecotourism operators.⁹⁶ Another study⁹⁷ found that, after its first three years of implementation, the mechanism had reinforced the political commitment and capacity for PFES, supported the forestry sector's contribution to the national economy and local communities, as well as protection of the environment.

Yet, challenges were recognized such as limited technical and communications capacity; relatively low payments compared with opportunity costs; trade-offs between effectiveness, efficiency and equity; and insufficient transparency and accountability. The National Biodiversity Strategy (MNRE 2015) found that PES had not been so widely used as expected, but activities in this area have continued. In 2020, ADB reported that one of its projects had started to pilot the PFES mechanism in 25 villages.⁹⁸ Norheim & Chien (2022) found that the FPDF is supporting the Western Nghe An Biosphere Reserve based on PFES, contributing to local economic development

⁹⁴ Vietnam Law & Legal Forum. 2010. Official Gazette, Decree No. 99/2010/ND-CP of September 24, 2010: On the policy on payment for forest environment services.

⁹⁵ Pham Khanh Nam and Isao Endo. 2021. *Protecting Watersheds in Viet Nam through Payment for Ecosystem Services, A Case Study*. Development Asia. <https://development.asia/case-study/protecting-watersheds-viet-nam-through-payment-ecosystem-services>

⁹⁶ ADB & MONRE. 2014. Project document: *Integrating biodiversity conservation, climate resilience and sustainable forest management in Trung Truong Son landscapes of Viet Nam*.

⁹⁷ CIFOR, MARD, VNFF & ADB 2014. *Payments for forest environmental services (PFES) in Vietnam. Findings from three years of implementation*. https://www.cifor.org/publications/pdf_files/factsheet/5066-factsheets.pdf.

⁹⁸ ADB. 2021 a. Project Implementation Report (PIR) 2020-2021 *ADB GEF Project Greater Mekong Subregion Biodiversity Conservation Corridors Project*.

and generating capital for forest restoration.⁹⁹ This includes payments to forest owners of set-aside areas.

4.3.5 Financing Mechanisms

Financing for forest operations and reforestation is central to sustainable forest management, but also a substantial obstacle. High interest rates can be a significant disincentive, and many commercial banks are reluctant to provide loans without safe collateral.¹⁰⁰ Nevertheless, there are emerging models to help channel funds to businesses engaged in sustainable practises.

National public expenditure on forests far exceeds that distributed via ODA, even in some low-income countries. Analysis of thirteen sub-Saharan countries showed national governments spent over three times more on forestry than the amount received in ODA. In 2018 the majority of 'land-use' spending on forestry in Cambodia was disbursed through central government, which in turn received a similar amount of funding from multi- and bi-lateral donors.^{101,102} This points to the potential for government disbursed finance to supplement and support the models described in this report.

As a result, governments can design funds to finance or co-finance emission reductions and removals, if possible, making use of REDD+ and other UNFCCC mechanisms. Once verified and issued, government can sell the credits to domestic or international private sector purchasers. Payments may be results-based linked to forest conservation offsets. Governments need to decide whether to sell credits in international compliance markets, only domestically, or in the voluntary markets. A challenge with the model is that governments only receive payments once emission reductions have been confirmed, a process that could take many years resulting in upfront funding gaps.

Green bonds are issued to raise finance for climate change mitigation and adaptation with the proceeds going to green assets in eight sectors: energy, buildings, transport, water, waste, nature-based assets, industry, and ICT. The bonds can be issued by central and local government, banks or corporations. The green bond label can be applied to any debt format, as well as labelled green loans. They need to comply with guidelines and standards such as the Green Bond Principles (GBP), Green Loan Principles (GLP), Climate Bonds Taxonomy and Climate Bonds Standard. In Asia there are the ASEAN Green Bond Standards. From 2008 to 2018, institutions and governments issued more than \$521 billion in green bonds. In the first half of 2019, new certified green bond issues amounted to \$100 billion globally, with a forecast for the full year of \$250 billion through 5,000 green bond issues.¹⁰³

The Asia-Pacific has seen the highest regional annual growth rate at 35 percent and had the second largest 2018 volume after Europe. The bulk of the regional growth can be attributed to the increasing financial corporate issuers in the market. Once limited to certain pension funds or small niche investors, sustainable investments have now become mainstream. Funds buying green bonds now include institutional investors such as PIMCO, BNP Paribas, and HSBC. Indonesia issued a green bond in 2018 and 2020 where one of the eligible categories was the financing of 'Sustainable Management of Natural Resources', including carbon sequestration through afforestation and reforestation.

Competitive funds for sustainable initiatives: To mainstream green credits, funding sources must engage the productive sectors systematically, through support to sector-wide platforms for selected commodities and implementing action plans. Also, they need to support and work through the supply chains and collaborate with buying companies in designing tailor-made solutions. Competitive funds

⁹⁹ Norheim, T. & Chien, P.D. 2022. Mid-term review of the UNDP-GEF project "Mainstreaming natural resource management and biodiversity conservation objectives into socio-economic development planning and management of biosphere reserve in Vietnam."

¹⁰⁰ FAO. 2022. The State of the World's Forests. <https://www.fao.org/3/cb9360en/online/cb9360en.html>

¹⁰¹ The EU REDD Facility and Climate Policy Initiative. 2018. *Land-use finance mapping in Cambodia*. <https://landusefinance.org/land-use-finance-mapping-cambodia/>.

¹⁰² FAO. 2022. The State of the World's Forests. <https://www.fao.org/3/cb9360en/online/cb9360en.html>

¹⁰³ Climate Bonds Initiative. 2018. *Green Bonds – the state of the market*.

https://www.climatebonds.net/files/reports/cbi_gbm_final_032019_web.pdf

co-financed by government, International Finance Institutions such as the ADB and international donors can be managed by national banks under established rules. This gives national firms and partners access to co-funding for innovative green solutions, where replication of the innovation gives benefits to the whole national sector.

Debt-for-nature-swaps are agreements that reduce a developing country's debt stock or service in exchange for a commitment to protect nature from the debtor government. It is a voluntary transaction whereby the donor(s) cancels the debt owned by a developing country's government. The savings from the reduced debt service are invested in conservation projects.¹⁰⁴ Even though private companies could be involved in different parts of these transactions and implementation, it has most often been the domain of international NGOs such as The Nature Conservancy (TNC) and Conservation International (CI). There are many examples where these NGOs through their networking can achieve additional co-financing from the private sector.

Although these financing mechanisms have proved to be effective, small farms still receive very little of available climate finance - less than 1.7 percent of such flows in 2019.¹⁰⁵ Smallholders tend to face a series of often insurmountable challenges. Unlike agriculture, for example, forestry has comparatively long gestation periods presenting often intractable cash flow problems and increasing the opportunity cost of sustainable forestry. Smallholders are also small scale, often lack clear and secure tenure and in many cases lack the business and plantation skills. Coupled with typically low saving rates and little in the way of collateral, accessing finance is problematic for many of the private enterprises that need to make the business models work.

Recently a number of innovative models have been attempted, although evaluations are lacking and results are mixed.¹⁰⁶ Indonesia, for example, has experimented with microcredit loan schemes with trees as collateral, although these have proved to have lengthy application times, short lending periods and rudimentary valuation. In Laos plantation management certificates have been accepted by banks as collateral, although not as frequently as desired.

There also remain inherent difficulties lending to low-income businesses. Setting aside issues of tenure and collateral, most small businesses do not have the means to manage the often-substantial risks attached to their investments. Some studies found that schemes tended to find more favour with wealthier farmers and larger enterprise in a better position to manage risk. Innovative loan products for forestry can also worsen local inequality, often a potential cause of conflict or may even lead to elite capture.¹⁰⁷ Ultimately, small holder finance remains relatively niche, and requires broader prerequisites to be successful.

Example: Local financing for reforestation in the Philippines

The Philippines has in place a range of initiatives to encourage and facilitate investment in sustainable forestry.

The Forestry Investment Road Map

The Forestry Investment Road Map (FIRM)¹⁰⁸ is the Philippine's "blueprint" to encourage private sector investment in the sustainable use of forest resources. The overall objective is to increase the contribution of the "Production Forest" from 0.01% of GDP to 0.14% GDP by 2028. The FIRM aims to provide an enabling environment for investments, generate additional and sustainable

¹⁰⁴ UNDP. 2017. *Debt for Nature Swaps*. In: Financing solutions for sustainable development.

¹⁰⁵ Starfinger, M. 2021. Financing smallholder tree planting: Tree collateral & Thai 'Tree Banks' - Collateral 2.0? *Land Use Policy*. 111.

¹⁰⁶ idem

¹⁰⁷ Persha, L. et al. 2014. Elite capture risk and mitigation in decentralized forest governance regimes. *Global Environmental Change*. 24. pp. 265-276.

¹⁰⁸ DENR. 2019. Forestry Investment Road Map 2018-2028. DENR. Available here: [The Forestry Investment Road Map.pdf - Google Drive](#)

forestry investments, ensure a sustainable supply of raw materials, and promote equity and social justice in forest dependent communities. The FIRM has short, medium and long term targets.

The FIRM has seven key components:

a) The provision of a stable enabling policy and investor-friendly environment;b) The institutionalization of forestry investment support mechanism;c) The identification, mapping, and assessment of potential investment areas;d) The provision of secure tenure and partnership agreements;e) The development and management of potential areas for forestry investments;f) Building, strengthening and sustaining partnership with existing tenure holders; andg) Marketing strategies.

Forestry Investment Portfolio Approach

To aid potential investors DENR has developed the Forest Investment Portfolio Approach¹⁰⁹. The Forest Investment Portfolio Package is developed by the Forest Investment Review Committee (FIRC) and technical Working Group (TWG). The TWG identifies and assesses investment areas, and includes the most suitable in the forest investment portfolio package. The objective is to facilitate and accelerate investment in forest areas. Potential investments include, but are not restricted to:

- Forest plantations
- Cattle grazing
- Ecotourism outside NIPAS areas
- Projects dependent on providing other forest ecosystem services.

The FIPA package will be offered through public bidding. Bidders are required to be Filipino citizens, or corporate bodies or associations of which 60% capital is Filipino. A registry of areas will be established, and made available through the DENR website.

Establishment of the Carbon Accounting

The Philippines has established a framework for the verification, certification (CAVCS) of forest carbon projects¹¹⁰. The objective is to establish the necessary systems for forest carbon projects to encourage investments in activities that sequester carbon dioxide and avoid emissions from forest deforestation and degradation. Eligible projects should be implemented for a minimum of 20 years. A working group oversees the implementation of the CAVCS. A verification body will verify Forest carbon Assessment reports produced every five years.

The Agroforestry Plantation Program (APP)

The Agroforestry Plantation Program (APP) is a credit assistance program for developing, expanding, harvesting, processing, maintaining and protecting industrial forest-based plantations in qualified private and public land between five and forty thousand hectares of open area¹¹¹. The program provides credit to eligible plantation operators and tenure holders who meet specific criteria and are implementing projects to develop plantations, invest in infrastructure and facilities, and develop ecotourism projects.

4.3.6 Public Private Partnerships

Public Private Partnerships (PPPs) are typically employed to foster private investment for long-term and large-scale projects where pure private solutions and financing are not possible. PPP can be defined as “a long-term contract between a private party and a government entity for the provision of a public asset or service, in which the private counterpart bears significant risk and management

¹⁰⁹ DENR. 2021. Guidelines in the implementation of the forest investment approach (FIPA). DENR. Available here: <https://law.upd.edu.ph/wp-content/uploads/2021/06/DENR-Administrative-Order-No-2021-04.pdf>

¹¹⁰ DENR. 2021. Guidelines on the establishment of carbon accounting, verification, certification system (CAVCS) for carbon projects. DENR. Available here: [DAO-2021-43 \(denr.gov.ph\)](https://www.denr.gov.ph/DAO-2021-43)

¹¹¹ Development Bank of the Philippines. 2021. Agroforestry Plantation Program. DBP. Available here: [APP.pdf \(dbp.ph\)](https://www.dbp.gov.ph/APP.pdf)

and responsibility and remuneration is linked to performance”.¹¹² Most PPP projects are contractual agreements of 20 to 30 years to provide the private sector with the incentives to invest and obtain a reasonable rate of return for involvement in asset building, service delivery, maintenance and operation.

In principle PPPs are employed to deliver public goods and operate in instances where externalities are not sufficiently captured. In most instances the government transfers, often partially or temporally, assets or stakes to the private sector. The role of the private actor varies depending on the type of asset involved, ownership structures and the combination of activities assumed by the private investors. However, PPP arrangements often concern the building or reparation of infrastructure assets, financing of capital expenditures, asset maintenance and the operation of assets or associated services.¹¹³

Presented in this way the potential application of PPP models to improve landscape management is clear. If forests and landscapes are largescale (green) infrastructure in need of periodic maintenance and renewal that provide a range of ecosystem goods and services, the value of which is not routinely captured in markets, then in principle similar models adopted for more conventional infrastructure and land use apply. PPP can also be a model by which governments improve the efficiency and productivity of the provision of - in this case environmental - goods and services, which might otherwise lack the level of expertise required.

Actual assets might include, for example, public natural forests, private forests, farm forests, multi-purpose plantations, habitat holdings, and regional carbon pools. Activities that might prove suitable for PPP arrangements include reforestation and sustainable forest management, watershed management, and the protection of coastal zones through sustainable mangrove management. Income streams include the production of future timber resources and the delivery of ecosystem services, potentially paid for by users including via PES type arrangements or government grants. PPPs can also be pursued in research, such as collaboration between forest firms and universities in undertaking trials such as in-vitro propagation, and establishing tree orchards for different species, sub-species and varieties. The increasing availability of funding mechanisms attached to the successful provision of ecosystem goods and services, including carbon credits can also provide a ready stream of revenues.

Yet, the diversity and complexity of landscapes as well as the social and economic interactions embedded within them mean that any PPP contracts must be carefully specified and leave room for private sector innovation. Risks and uncertainty such as fire, species growth rates, and climate impacts must be carefully accounted for. Moreover, information about the landscape must be captured to properly appreciate uncertainties and monitor the performance of PPPs. Governments themselves should also strive to become ‘smart’ purchasers of ecosystem goods and services and ensure that payments are focussed on explicit outcomes.

PPP models need to be carefully tailored to individual landscapes. Operation and maintenance type contracts, in which the private sector maintains landscapes in receipt of payments from government without changes in ownership or build-operate-transfer or concession contracts may be suitable models. Such arrangements might also go hand in hand with interventions in value chains, whereby private firms are encouraged to build the capacity of small-scale producers, in the process bringing and transferring knowledge and techniques.

As with other business models for sustainability, ensuring the required institutions, expertise and legal framework are in place will be essential for PPPs to work. In most cases government will need to ensure sufficient landownership rights are in place and local actors have sufficient capacity.

Example: PPP for watershed restoration to bring drinking water to Metro Manila

¹¹² World Bank. 2017. *Public-Private Partnerships Reference Guide*. World Bank

¹¹³ World Bank. 2017. *Public-Private Partnerships Reference Guide*. World Bank

The La Mesa Watershed (LMW) supplies drinking water to Metro Manila. Decades of slash and burn agriculture and illegal logging has severely degraded the watershed.¹¹⁴ Starting in the late 1970s the Government contracted private companies to reforest and administer the watershed (Box 4.2).

Box 4.2: La Mesa Reforestation

Institutional History¹¹⁵

Government property titled under Metropolitan Waterworks and Sewerage System (MWSS)
Contracted Manila Seedling Bank Foundation, Inc. (MSBFI) to undertake massive reforestation (1978-1983)
In 1999, Bantay Kalikasan (BK) of ABS-CBN Corporation signed an agreement with MWSS to reforest and administer the watershed.

Reforestation Initiatives (Andres et al 2015)

1978 - 1983: Manila Seedling Bank Foundation, Inc. (MSBFI)
1984 - 1999: Alpha Omega Foundation
1998 - 2000: DENR-NCR, Ecosystem Research and Development Services (ERDS)
1999 – Present: Bantay Kalikasan (BK) of ABS-CBN Corporation

Site Description^{116,117,118}

Location: northern most part of Metro Manila; situated between Metro Manila, Bulacan and Rizal; Area: approximately 2,659 ha; Topography: gently undulating terrain; Elevation: 46 – 256 m a.s.l.; Slope: <24 percent; Soil type: Novaliches and Marikina Series

Management Institutions: MWSS, DENR, local government of Quezon City, ABS-CBN Lingkod Kapamilya Foundation, Inc. (ALKFI), the La Mesa Executive Board, the La Mesa Resort Zone Executive Committee, and the Multi-Sectoral Watershed Management Council (MSWMC).

Reforestation Outcomes

Carbon stock of 140,000 ton C partitioned into tree plantations (113,000 ton C), secondary forests (20,000 ton C) and brushlands (6,970 ton C). From 2002 to 2016, net forest cover gain of 557 hectares. Increased in dense vegetation cover three years after the implementation of the rehabilitation project in 1999. Relatively high diversity of native trees with 70 species of the total 92 tree species were recorded. 14 species were found to be endemics while 7 species were listed in either the IUCN or Philippine Red List.¹¹⁹ 520 plant species were identified in the watershed with 10 species classified as vulnerable, 7 were endangered, and 4 were critically endangered. In terms of faunal diversity, at least 90 bird species were found in the area with 24 species classified as endemic, 53 as residents, 11 as migrants, and 1 as migrant/resident.¹²⁰

The main private sector partner is Bantay Kalikasan (BK) (Environment Watch), part of the ABS-CBN Foundation.¹²¹ Bantay Kalikasan was established in 1998 and is now the biggest media-led environment organization of the Philippines. Starting with initiatives such as Bantay Baterya in Langis which focused on responsible waste disposal and community development, core program areas are now the protection of biodiversity areas, eco-tourism, watershed management and job generation.

¹¹⁴ ICEM & ICRAF 2021. *Draft Philippine National Restoration Profile*. TA-6539 REG: Investing in Climate Change Adaptation through Agroecological Landscape Restoration - 1 Climate Change Risk and Adaptation/Restoration Option Assessment in Cambodia, Myanmar, and Philippines (53348-001), Prepared for Asian Development Bank. Hanoi.

¹¹⁵ Malabrigo, Jr., P.L., Tiburan, C.L., Galang, M.A. & Saizer, I. 2015. Tree Diversity at La Mesa Watershed in Luzon - A Reforested Urban Watershed. *Asian Journal of Biodiversity*. 6 (2). pp. 22-40.

¹¹⁶ idem

¹¹⁷ Lasco, R.D., & Pulchin, F.B. 2006. Assessing the Role of Watershed Areas in Mitigating Climate Change in the Philippines: The Case of the La Mesa Watershed. *Journal of Environmental Science and Management*. 9(1). pp. 19-29.

¹¹⁸ Estoque, R.C. et al. 2018. Assessing Changes in the Landscape Pattern of the La Mesa Watershed – The last ecological frontier of Metro Manila, Philippines. *Forest Ecology and Management*. 430. pp. 280-290.

¹¹⁹ Malabrigo, Jr., P.L., Tiburan, C.L., Galang, M.A. & Saizer, I. 2015. Tree Diversity at La Mesa Watershed in Luzon - A Reforested Urban Watershed. *Asian Journal of Biodiversity*. 6 (2). pp. 22-40.

¹²⁰ Andres, E.P., Sabater, M.S., Espada Jr., E., Calzeta, E.C & Arjona, R.C. 2015. Vulnerability Assessment of the La Mesa Watershed Reservation, Quezon City, Philippines. *Sylvatrop: The Technical Journal of Philippine Ecosystems and Natural Resources*. 25 (1 & 2). pp. 1-26.

¹²¹ ABS-CBN Foundation International. 2022. *Protecting the Philippines to Protect Filipino Lives*.
<https://abscbnfoundation.org/environment-and-community>

4.3.7 Community Forests

Many communities are dependent on forests for their livelihoods, and there is some evidence, although not conclusive and heavily caveated, that local and indigenous communities with long experience and attachment to forest land are in a better position to conserve forest land. The benefits of community forestry are numerous, and include construction wood, firewood, biodiversity conservation, watershed protection, soil and water conservation, and non-wood forest products. Yet, even when local populations recognize the opportunities, other land uses may appear to be more profitable in the short term, suggesting the need for programs to help communities to engage in more sustainable activities.

Models to engage with community forests range from supporting SMFEs and their integration into more profitable (and sustainable) value chains to ecotourism and PES type programs. Communities tend to engage with markets via small and medium sized forest-based enterprises (SMFEs), which employ millions of people worldwide. However, the constraints local communities and SMFEs face mean strong and consistent outside support is necessary.

SMFEs face a range of challenges. SMFEs may face unsupportive regulatory regimes or lack the basic infrastructure required to access markets. Most struggle to achieve economies of scale, and are required to collaborate with other enterprises, in the process often facing substantial transaction costs. Most lack the technical, managerial and financial capacity to overcome these issues, develop products and services and access markets. Many SMFEs lack savings and collateral and, assuming finance is available, will struggle to access it.

For SMFEs to overcome these challenges governments need to tackle one or more of a long list of barriers. Sanchez-Badini et al. (2018), for example, list twelve “emergent critical success factors” which are a combination of a conducive enabling environment and firm capability, only achievable with coordinated national level policy and firm level support. The twelve success factors relate to macroeconomic setting, regulatory frameworks, forest law enforcement, tenure and ownership rights, management and land use planning rights, markets, natural capital, financial capital, forest management capacities, business management capacities, organizational capacities, and clustering.¹²² Further evidence suggests that outside support for community forest programs and SMFEs appears to mitigate against the risk of 'elite capture' of forest harvest benefits, also pointing to the importance of institutional design.¹²³

¹²² Sanchez-Badini, O. et al. 2018. Critical success factors for small and medium forest enterprises: A review. *Forest Policy and Economics*. 94. pp. 35-45.

¹²³ Persha, L. et al. 2014. Elite capture risk and mitigation in decentralized forest governance regimes. *Global Environmental Change*. 24. pp. 265-276.

5 Summary and Conclusions

In many tropical countries, and particularly in Southeast Asia, deforestation leading to land degradation and biodiversity loss is ongoing, even in countries reporting increases in forest cover. Acknowledging the largescale drivers of deforestation such as land use change, population growth, economic development and attendant infrastructure investment, urbanisation and consumer demand is necessary to appreciate the sets of incentives stakeholders face and the necessary institutional, policy and regulatory reforms necessary to encourage more sustainable practises. In some countries the challenge may not be the imposition of new laws and regulations to protect forests and biodiversity, but increased resources provided to existing institutions and the better enforcement of regulations already in place.

An outcome of more relaxed trade regimes, rapid economic development and attendant consumption growth, population pressures and infrastructure investment are higher opportunity costs of business models for sustainability. Although governments' capacity and willingness to tackle the impacts of such large scale and complex drivers are often limited there is scope to build the enabling environment to encourage more sustainable approaches.

The rewards from unsustainable land use and the costs of sustainable practises point to the need for initiatives to provide a more supportive enabling environment and tilt the sets of incentives in favour of landscape friendly business models. In many countries forestry is viewed differently from other land uses, including the agricultural sector. While governments promote opening new land for agriculture and livestock, and provide strong incentives for these sectors, they indirectly constrain the forestry sector by imposing taxes on forest products and complex bureaucracy in managing forest uses, often with unintended consequences. Extensive permit- and control mechanisms, for example, can encourage deforestation by making it difficult, costly and slow to comply with the law, encouraging illegal activity.

Forest management for ecological sustainability requires a holistic and integrated approach that ensures all stakeholders are sufficiently committed, institutions and policies aligned, and support is provided for those without capacity. A first step is to identify how the broader regulatory regime and institutional architecture can be aligned more convincingly in favour of sustainable landscape practises, and to better enforce existing regulations and to provide additional support to existing forest and environmental agencies. The public sector has an essential role in promoting and facilitating business models for sustainability – but it can only do so with adequate authority, resources and capacities.

This report has outlined a range of business opportunities and models that can be utilised to lower the costs of sustainable landscape management and at the same time increase the potential financial returns and wider benefits. They are:

- **Certification of ecologically sustainable production:** The model focused on agro-forestry commodities but is applicable for a range of products. There are many certification mechanisms and the premium achieved in the international market varies a lot. A good quality product of certified organic shade-grown coffee from Arabica beans, for example, can achieve a huge premium compared to standard not certified coffee. There is much progress on certified coffee, cocoa and tea in Asia, and promising systems evolving for forests.
- **Value chain development:** To establish markets with reliable end buyers and good prices, it is necessary for all the links in the value chain to work well - one weak link can ruin the business for the primary producer. This requires good vertical integration, but also horizontal integration between producers to assure sufficient volumes of high-quality produce.
- **REDD+:** Reduced emissions from deforestation and forest degradation is a UNFCCC recognized mechanism in favour of forest conservation. Many countries have now passed the initial step

of achieving “REDD readiness” and are eligible for significant results-based payments, where the country area is the monitoring unit.

- **Financial mechanisms:** The models presented include carbon credits, green bonds, competitive funds, debt-for-nature-swaps, and models to improve access to finance for small-scale producers. There are many other financial mechanisms, and interest in the markets, including development banks, GEF and GCF, to work more on alternatives to conventional donations.
- **Public-Private Partnerships:** PPP can resolve trade-offs between public and private interests through joint programs or joint venture companies. The flexibility of the private sector and its potential to bring additional funding are important advantages of the PPP.
- **Payments for Ecosystem Services:** PES is a transaction mechanism that require buyers and sellers of the service, which could occur when the buyers are interested in conservation of the natural resources, e.g. water companies or hydro-electric power plants. PES are local long-term agreements, normally between private stakeholders, but often requires public sector involvement.

These models can encourage and support private sector actors to pursue business opportunities in vulnerable landscapes, through for example:

- **Intensive agriculture,** which, if complemented by controls over land use and support to farmers, can increase the output of existing plots relieving pressure on vulnerable landscapes.
- **Agricultural commodities:** The most important agricultural commodities, such as meat, soy, rice and palm oil have severe environmental and climate footprints. International agencies are working with the private sector to reduce or eliminate deforestation and make these commodities more sustainable. Yet, it remains a critical field requiring much greater attention and funding.
- **Conservation agriculture** includes many elements that can be of interest to private farms of any size, to improve sustainability and profitability. Conservation of the main production elements - soil and water - ensures long-term benefits.
- **Agroforestry for sustainable land management:** Agroforestry, including silvopasture,¹²⁴ reduces the negative environmental impact of the agricultural production and can improve efficiencies. Agroforestry can be on-farm or off-farm, and include non-timber forest products such as nuts, natural oils, palm heart, and fruits.
- **Wood products** such building materials, pulp and paper and wood as a source of energy.
- **Ecotourism,** especially suitable for micro and small enterprises, can provide jobs, improve local welfare, and attract local funding to protected areas and conservation efforts.
- **Plantations** if set up to provide for biodiversity gains are typically easier to manage than natural forests with a better economic return.
- **Selection Forest Systems,** that maintain areas in a similar way to natural forests can, if well managed, provide significant economic returns.

To summarize: To improve the economic-financial viability of land-based businesses, the productive land units can be managed through integrated systems that consider a combination of suitable business options, e.g. production and protection forests, agroforestry, conservation agriculture, PES, carbon trade, and ecotourism; as well as value chain development and different forms of certification. When such integrated systems succeed, they reduce deforestation, in favour of climate change mitigation and adaptation, disaster risk reduction and biodiversity conservation.

¹²⁴ Silvopasture is the deliberate integration of trees and grazing livestock operations on the same land. These systems are intensively managed for forest products and forage, providing both short- and long-term income sources.

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Bohol Landscape (photo by Henrik Kal).



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