TRAINING REPORT

AFoCO-ITTO Capacity Building Workshop on Forest Landscape Restoration in the Asia-Pacific Region: Developing capacities needed for successful FLR interventions in the Tropics

Workshop Highlights

30 September – 3 October 2021

AFoCO

ITTO
ORGANIZACIÓN INTERNACIONAL DE LAS MADERAS TROPICALES

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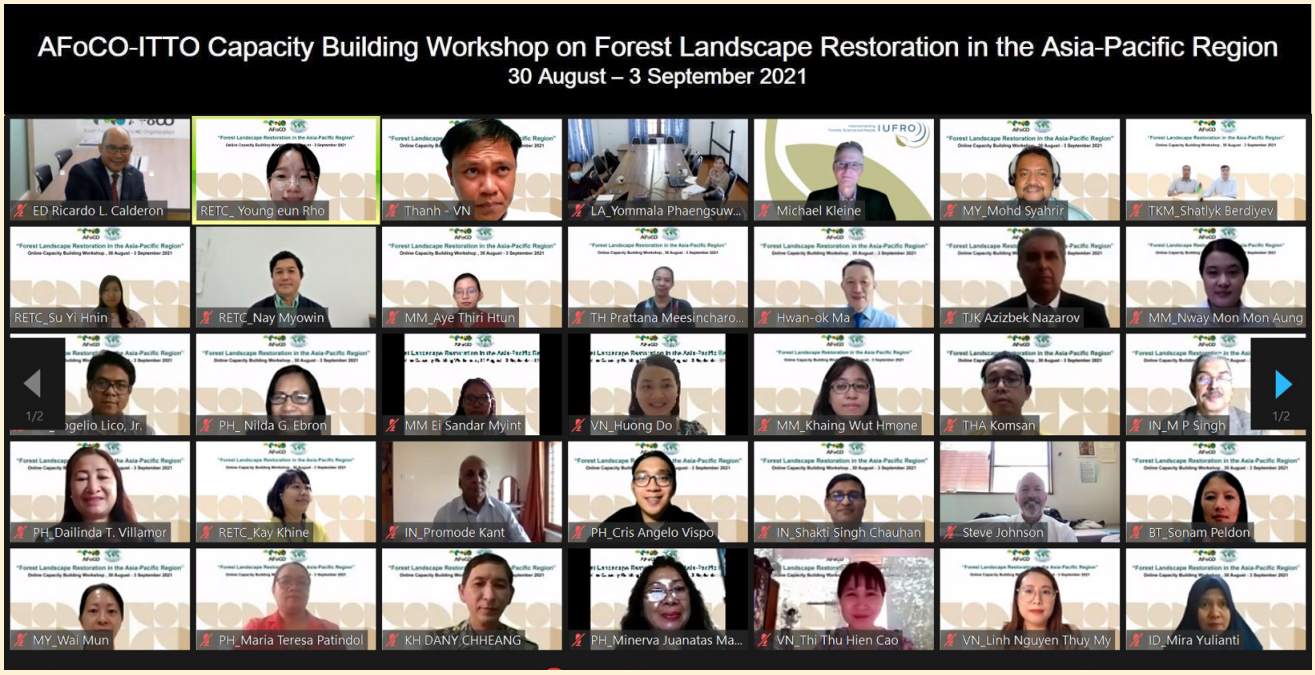
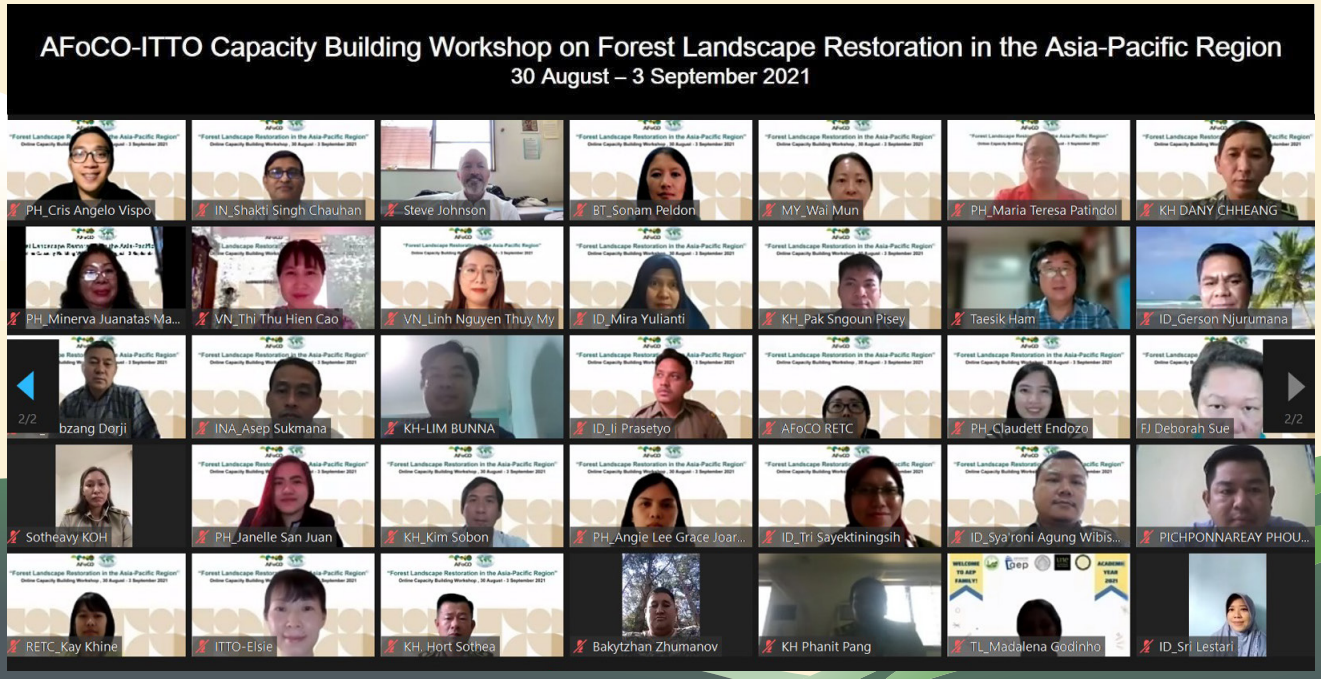
ABOUT THE WORKSHOP

Jointly organized by the Asian Forest Cooperation Organization (AFoCO) and the International Tropical Timber Organization (ITTO), the "AFoCO-ITTO Capacity Building Workshop on Forest Landscape Restoration in the Asia-Pacific Region: Developing capacities needed for successful Forest Landscape Restoration interventions in the Tropics" sought to enhance the capacities of AFoCO and ITTO member countries in the Asia-Pacific region to undertake successful restoration initiatives using the new ITTO Guidelines for Forest Landscape Restoration in the Tropics. Specifically, the workshop aimed to provide participants with a comprehensive understanding of the core principles and associated guiding elements that form the foundation of forest restoration. To achieve this objective, AFoCO and ITTO arranged four keynote talks and six lectures by well-known experts in the field, each of which was followed by detailed discussions in which participants participated actively in. The workshop also provided an excellent opportunity to share lessons from national and local restoration cases, as well as the challenges and opportunities they can present for local people and other stakeholders. This publication provides highlights from these keynote talks and lectures and outlines salient points raised during the follow-up discussions.



AFoCO thanks all participants for their active participation and contributions to the workshop!



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ABBREVIATIONS & ACRONYMS

ADB	Asian Development Bank
AFR	The African Forest Landscape Restoration Initiative
CFUG	Community Forestry User Group
CO_2	Carbon dioxide
CPD	Cooperation and Project Division
CPF	Collaborative Partnership on Forests
CPIC	Coalition for Private Investment in Conservation
EP-ANR	Enrichment Planting and Assisted Natural Regeneration
ER	Extended Rotation
EVI	Enhanced Vegetation Index
FAO	Food and Agriculture Organization
FLR	Forest Landscape Restoration
FPIC	Free, Prior, and Informed Consent
GCF	Green Climate Fund
GDP	Gross Domestic Product
GE	Guiding Elements
GEE	Global Earth Engine
GEF	Global Environment Facility
GHG	Greenhouse Gases
GIS	Geographic Information System
GIZ	German Agency for International Cooperation
GPFLR	Global Partnership on Forests Landscape Restoration
GtC	Gigatonnes of Carbon
$GtCO_2e$	Gigatonnes of Carbon Dioxide Equivalent
IPCC	Intergovernmental Panel on Climate Change
ITTO	The International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
KfW	The Kreditanstalt für Wiederaufbau
LAC	Latin America and the Caribbean
NbS	Nature-based Solutions
NDA	National Designated Authority
NDCs	Nationally Determined Contributions
NSI	Native Species Introduction
NWFP	Non Wood Forest Product
NYDF	New York Declaration on Forests

ABBREVIATIONS AND ACRONYMS

PES	Payments for Ecosystem Services
ppm	Parts Per Million
PSSAs	Private Sector Set-Asides
RECOFTC	The Centre for People and Forest
REDD+	Reducing Emissions from Deforestation and Forest Degradation-Plus
ROAM	Restoration Opportunities Assessment Methodology
SERD	School of Environment, Resources and Development
SFM	Sustainable Forest Management
SWC	Soil and Water Conservation
tCO_2	Tons of Carbon dioxide
UK DFID	United Kingdom Department for International Development
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VAFS	Vietnamese Academy of Forest Sciences
WRI	World Resources Institute
WWF	World Wide Fund for Nature

01

KEYNOTE ADDRESSES

1.1 Forests and climate change: Forests as an element in a carbon-neutral commitment 08

1.2 Six principles for successful FLR: ITTO Guidelines for FLR in the Tropics 10

1.3 Best Practices Approaches in Forest-Related Ecosystem Restoration 15

1.4 Financing Forest Landscape Restoration 19

1.1 KEYNOTE ADDRESS

Forests and climate change: Forests as an element in a carbon-neutral commitment


Prof. Jürgen Blaser (Photo by Pilar Valbuena, FAO)

Speaker

Prof. Jürgen Blaser, University of Bern, Switzerland

Moderator

Dr. Hwan Ok Ma, Project Manager of ITTO

Rapporteurs

- Ms. Sonam Peldon, Principal Forestry Officer, Department of Forest and Park Services of Bhutan
- Ms. Emelia Gunggu, Senior Assistant Secretary, Ministry of Plantation Industries and Commodities of Malaysia

Prof. Blaser presented a global overview of forests. Forests cover about 4 billion ha, or one-third of the Earth's land surface, 53% of which falls in the tropical or subtropical zone. About 93% of these forests are natural or semi-natural forests, with plantations taking up about 7% of them. But going by the extent of forests until about 10,000-15,000 years ago, it should be possible for forests to cover as much as 8 billion ha of the Earth's land surface. It must be noted that while forests mitigate climate change by sequestering CO_2 from the atmosphere, they also reflect less solar radiation to the atmosphere than land covered with snow, leading to warming. The reflection of solar irradiation (i.e., albedo effect) by broadleaved forests (15-25%) and coniferous forests (5-15%) is far lower than snow (40 to 90%). In the tropics, with no snow to reflect solar energy, forests have only a cooling effect.

Forests, on balance, contribute to global warming mitigation, which international cooperation mandated by global treaties like the UNFCCC aims to enhance. This occurs through the process of sequestering carbon dioxide (CO_2) in forest vegetation and its long-term storage away from the atmosphere. But forests also emit CO_2 through the decay and death of vegetation. Forests are, in fact, the second-biggest source of GHG emissions, contributing about 10% of the global total.

And just as forests influence climate change significantly, the changing climate also impacts ecosystems, wood production chains and the people they serve. Forests serve to reduce the vulnerability of ecosystems and communities to the changing climate. Mitigation and adaptation options in the forest sector need to be fully understood and used in an integrated way to promote sustainable development. In the year 1900, the CO_2 concentration in the atmosphere was 295 ppm, increasing to 360 ppm by 1995 and 415 ppm as of August 2021. If the average CO_2 concentration in the atmosphere continues to increase in this manner to 500 ppm and higher, forests will become highly vulnerable. There is a high risk that forests, instead of acting as a GHG sink, will become primarily a source of GHG emissions. This phenomenon has already been reported in some parts of the world, such as in the southern Amazon.

Prof. Blaser summarised the most recent findings of the IPCC as below:

i. Deforestation has been the cause of one-third of anthropogenic CO_2 emissions since industrialization began in the second half of the eighteenth century. Today, about 10% of CO_2 emissions come from land-use change, mainly tropical deforestation. Emissions from land-use change are compensated by the growth of established forests, mainly in temperate and boreal regions. As a result, today's world's forests are a net carbon sink, reabsorbing about one-third of anthropogenic CO_2 emissions.

ii. Forests are vulnerable to changing climate. Cases of increased tree mortality due to droughts have been observed on all continents. Seventy percent of tree species are operating close to their limits of water stress tolerance during at least a part of the year.

iii. Late successional trees in a forest mostly belong to species with the longest generation time and slowest spatial distribution. Thus, genetic adaptation in these trees, and migration to more suitable climes, is unlikely to keep track with even moderate climate change scenarios.

Forests are a mitigation option now and will hopefully continue to be so over the next 50-80 years. They could serve as one of the most important transitional tools toward a low-carbon economy if the global community can agree on the proposed circular bioeconomy, an economy powered by nature. Under current climate conditions, the typical carrying capacity of temperate forests is 500 m^3ha^{-1} of biomass or 136 $tCha^{-1}$, that of boreal forests is 65 $tCha^{-1}$, and that of tropical forests is 186 $tCha^{-1}$. The current amount of carbon dioxide in the world's forests is estimated to be 861 (+/- 66) GtC, 55% of which is stored in tropical forests, 32% in boreal, and 14% in temperate forests.

Of the total global CO_2 emissions of about 40.2 $GtCO_2\ yr^{-1}$, 5.5 $GtCO_2\ yr^{-1}$ is the result of deforestation and forest degradation. About 11.5 $GtCO_2\ yr^{-1}$ of the total emissions is sequestered in vegetation on land and 9.5 $GtCO_2\ yr^{-1}$ gets absorbed in oceans, while the rest enters the atmosphere. Sustainable Forest Management (SFM) in existing good forests, and FLR in deforested and degraded landscapes followed by SFM, proactively increase CO_2 storage in forests by reducing sources of emissions within forests. This is achieved by reducing deforestation, avoiding degradation and by keeping carbon storage intact, while also enhancing forests role as a carbon sink through afforestation and reforestation, enrichment planting and assisted natural regeneration.

As per the yet unpublished data in IPCC AR6, the estimated forest-based mitigation potential at the global level is:

Reforestation/Afforestation/FLR = 3.7 (0.5–10) $GtCO_2e\ yr^{-1}$
Sustainable Forest Management = 1.8 (1– 2.1) $GtCO_2e\ yr^{-1}$
Estimated Total = 5.5 $GtCO_2e\ yr^{-1}$

So presently, forests continue to act as carbon sink on balance, but as the temperature warms, it will be necessary to find ways to increase the resilience of forest ecosystems; otherwise, wildfires, insects, and diseases will severely limit the role of forests as a mitigation option. Besides, there are many governance issues pertaining to land rights, tenure, access, land-use planning, benefit-sharing, and inadequate law enforcement that can have the same effect.

1.2 KEYNOTE ADDRESS

Guidelines for Forest Landscape Restoration in the Tropics


Prof. Jürgen Blaser (Photo by Pilar Valbuena, FAO)

Speaker

Prof. Jürgen Blaser, University of Bern, Switzerland

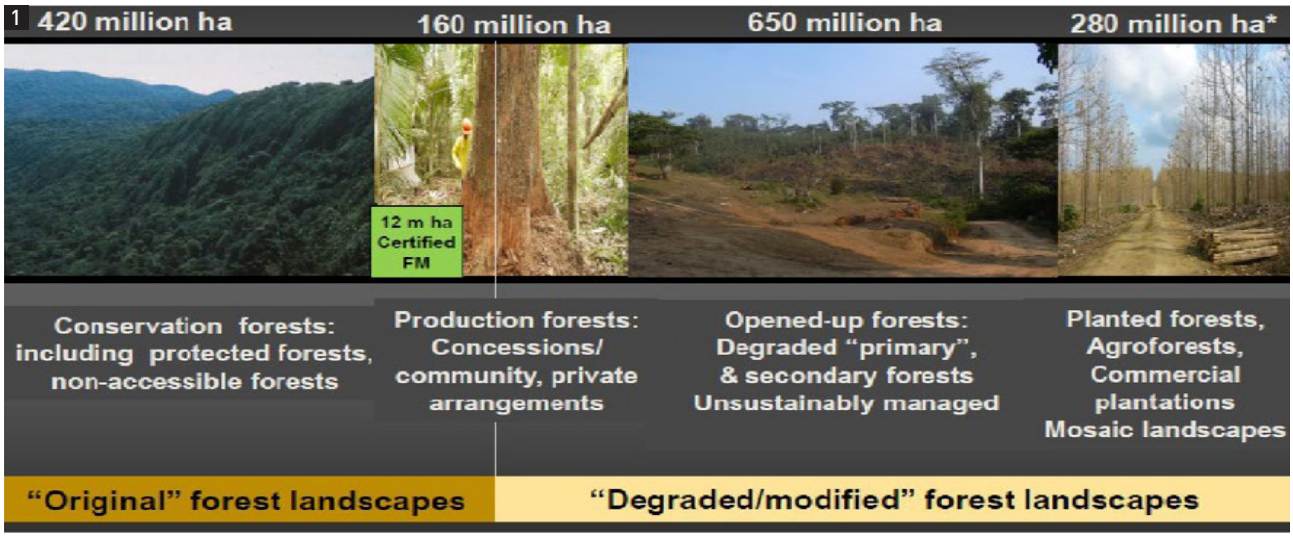
Moderator

Dr. Hwan Ok Ma, Project Manager of ITTO

Rapporteurs

- Ms. Khaing Wut Hmone, Staff Officer, Forest Department of Myanmar
- Ms. Claudette Endozo, Forest Resources Conservation Division, Forest Management Bureau of the Philippines

Introducing the subject, Prof. Jurgen Blaser noted that the guidelines for forest landscape restoration have emerged from an important decision of the ITTO Council in 2017, which reviewed the 2002 ITTO guidelines for the restoration, management, and rehabilitation of degraded and secondary tropical forests. In addition, a moving force behind these guidelines has been the Collaborative Partnership on Forests (CPF), which brings together international organizations, UN agencies, and UN mechanisms with substantial forest programmes with the objective of achieving ambitious long-term goals in the management, conservation, and sustainable development of all types of forests.



*Area estimates are by J. Blaser and C. Sabogal.

*Converted natural forest to other land uses (1985-2015)

Figure 1: Forest Landscape in Humid/ Semi Humid Tropics, Estimates 2015

(Source: Blaser, 2003; Gregersen, El Lakani, Blaser, 2017)

As suggested in Figure 1, globally, about 650 million ha of open forests, degraded primary and secondary forests, and unsustainably managed forests are available for FLR. Another 280 million ha of planted forests, agroforests, commercial plantations, and mosaic landscapes are available to be pushed toward their natural ecosystem status, and about half of the 160 million ha of production forests, concessions, and common property forests belonging to communities also require FLR interventions to turn them into more productive ecosystems.

Forest landscape restoration has been defined in the guidelines as an ongoing process of regaining ecological functionality and enhancing human well-being across degraded and deforested forest landscapes. This process has three key components — participation, adaptive management, and a monitoring and learning framework consistent with these key requirements of participation and adaptation. The overarching goal of the guidelines is building sustainable tropical forest landscapes in the tropics. For this purpose, the guidelines help create an enabling policy framework in implementing countries and form a guidance tool for planning and implementing restoration and management practices at the site and landscape levels.

The founding pillars of the guidelines are the six internationally agreed principles of FLR adopted in 2018 by the Global Partnership on Forests Landscape Restoration (GPFLR):

Principle 1
Focus on landscapes

FLR focuses on restoring landscapes, not specific sites in a forested area, taking into account the full range of interacting land uses, tenure, and governance arrangements in the landscape while recognizing that these conditions may evolve or otherwise change in the times ahead.

Principle 2
Engage stakeholders and support participatory governance

FLR actively engages stakeholders of all hues, strengths, and vulnerabilities across gender, social status, incomes, and age in order to reach decisions on restoration goals and strategies, implementation methods, benefit-sharing, monitoring, assessment, and reviews, while harmonizing diverse perspectives and interests.

Principle 3
Restore multiple functions for multiple benefits

FLR aims at restoring multiple socio-economic and environmental functions in a landscape, generating a range of ecosystem goods and services that would equitably benefit all stakeholders. As an example, FLR in a degraded landscape may aim at restoring forests that produce timber, fuel, and NWFP; controlling erosion on slopes; conserving moisture and enriching tiny water sources in a habitat; enhancing biodiversity; and increasing carbon storage, while being aware of the desirability of trade-offs in specific situations.

Principle 4
Maintain and enhance natural forest ecosystems within landscapes

FLR aims to halt the degradation of natural forest ecosystems; ensure their recovery, conservation, and sustainable management; and conserve and enrich biodiversity, while increasing the capacity of landscapes to deliver goods and ecosystem services. It should not cause the loss or conversion of natural forests, natural grasslands, or other natural habitats.

Principle 5

Tailor to the local context using a variety of approaches

This principle seeks to ensure that the restoration of a landscape responds to the needs of local people and ecosystems, considering the history and legal context of the landscape, and adapts well to local values. This is best ensured through the fullest involvement of local stakeholders in the development, implementation, monitoring, and assessment of restoration activities.

Principle 6

Manage adaptively for long-term resilience

The restoration to be effective must last long and, therefore, must consider the fact that stakeholders' priorities are likely to change over time as communities evolve in numbers, interrelations, skills, and aspirations. FLR interventions, while tailored to the conditions prevailing at the time of commencement, should be capable of adapting to evolving circumstances.

Each of these six principles is implemented through a set of guiding elements (GE) that number 32 in total.

P1. Focus on landscapes

- GE1 Undertake inclusive, gender-responsive landscape-level assessment and land-use planning
- GE2 Gain recognition that FLR must transcend sector policies
- GE3 Conduct FLR at an appropriate scale
- GE4 Address tenure and access rights

P2. Engage stakeholders and support participatory governance

- GE5 Build adequate governance capacity for decentralized FLR
- GE6 Obtain strong stakeholder engagement
- GE7 Conduct joint stakeholder analysis of the drivers of degradation
- GE8 Strive for social equity and benefit-sharing
- GE9 Conduct participatory FLR planning, decision-making, and monitoring
- GE10 Build stakeholder capacity for sharing responsibility for FLR
- GE11 Address long-term financing for FLR initiatives
- GE12 Establish a favorable investment environment for FLR

P3. Restore multiple functions for multiple benefits

- GE13 Generate multiple functions and benefits
- GE14 Conserve biodiversity and restore ecological functions
- GE15 Improve livelihoods
- GE16 Make full use of locally based knowledge

P4. Maintain and enhance natural forest ecosystems within landscapes

- GE17 Avoid the conversion of natural forests
- GE18 Restore degraded forests and rehabilitate degraded forest land
- GE19 Avoid forest fragmentation
- GE20 Conserve natural grasslands, savannas, and wetlands

P5. Tailor to the local context using a variety of approaches

- GE21 Assess local context and restrictions
- GE22 Allow for future changes in conditions
- GE23 Tailor FLR interventions to the local context and generate local benefits
- GE24 Achieve the financial and economic viability of FLR investments
- GE25 Identify opportunities to increase local incomes
- GE26 Develop sustainable supply chains

P6. Manage adaptively for long-term resilience

- GE27 Take an adaptive management approach
- GE28 Continually measure the biophysical dimensions of the landscape
- GE29 Periodically assess vulnerability to climate change
- GE30 Develop participatory monitoring of FLR
- GE31 Encourage open access to, and the sharing of, information and knowledge
- GE32 Report on FLR outcomes

Forest landscape restoration will last long and continue to respond to ecological, economic, and social needs in perpetuity when these six principles and 32 guiding elements form a continuum as shown in Figure 2 below:

2

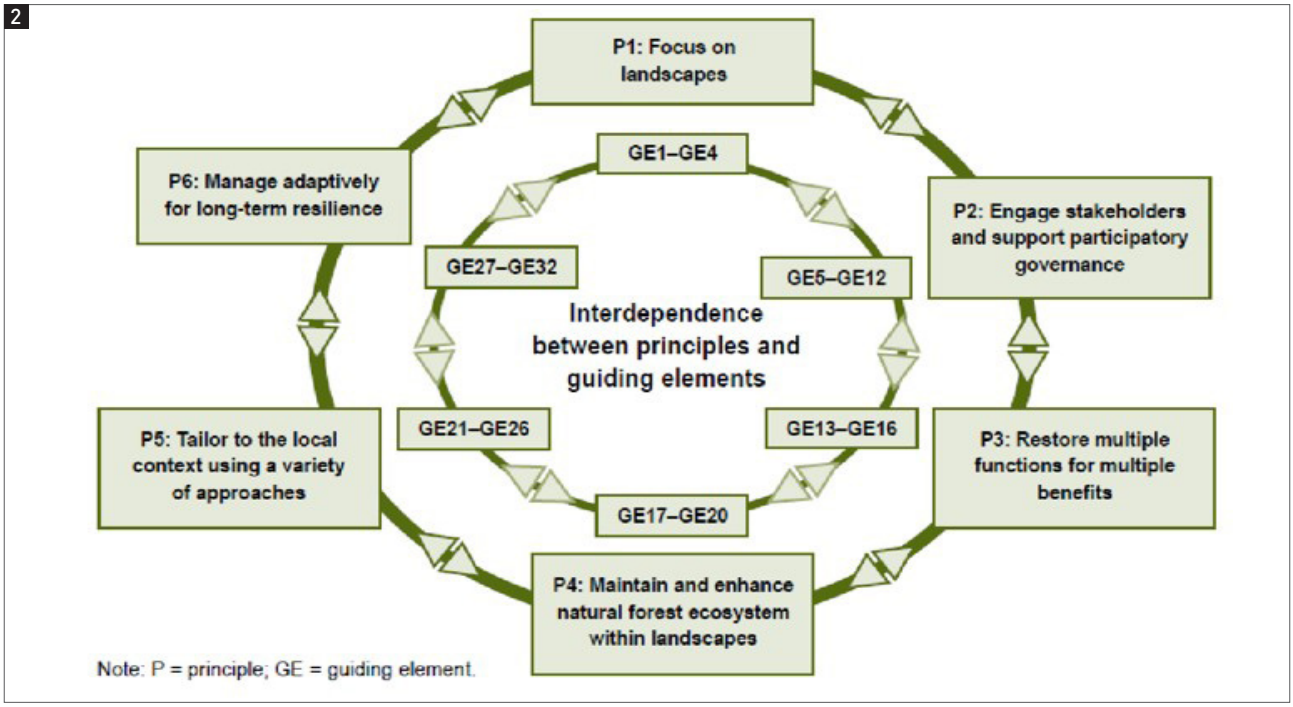


Figure 2: Principles and Guiding Elements of FLR -a Continuum

(Source: ITTO, 2020)

3

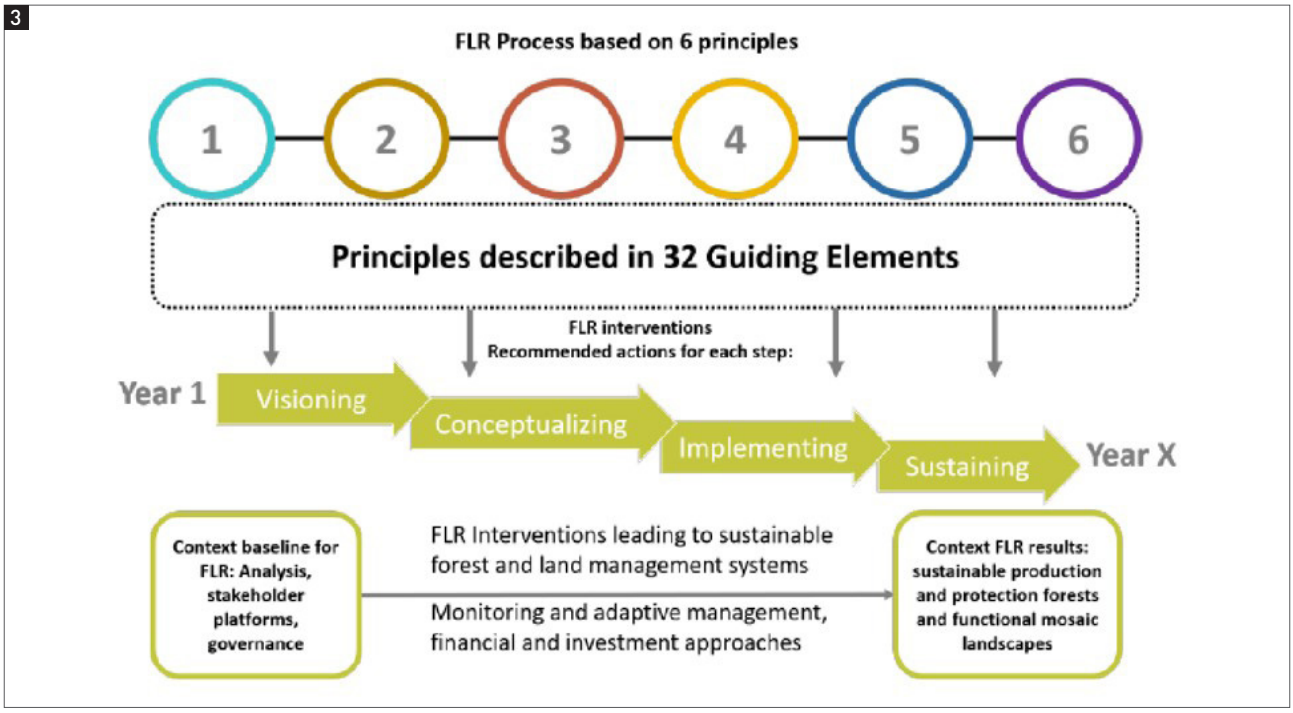


Figure 3 The Four Phases of FLR Implementation

(Source: Basic structure inspired by Stanturf et al. (2019)

The operational framework of the guidelines have four phases, namely visioning, conceptualization, implementation, and sustaining achievements, as shown in Figure 3. The way forward is to take widespread action to encourage the use of the guidelines at the national and local levels, apply the guidelines as a reference and guiding document in the development of FLR interventions at the national and subnational levels, use the guidelines as a vehicle for capacity building to undertake FLR, prioritize landscapes for FLR, and put in place mechanisms for meaningful interactions among stakeholders in such landscapes.

Besides, there is a need to promote the use of these guidelines to advocate FLR in broader international conventions and processes, and among international organizations that can then help disseminate and apply the guidelines with local actors and other stakeholders in countries that need such support. Equally important is the need to monitor the impacts of these guidelines on changing practices in forest and landscape use throughout the tropics in order to learn lessons and take course correction measures.

In conclusion, FLR as envisaged in this guideline — restoring forest landscapes, planting trees, and sustainably managing and protecting existing forests against degradation — constitutes a cost-effective strategy for reaching the goals of the Paris Agreement, including countries' carbon-neutral commitments. It will also help the global community reach the Sustainable Development Goals and several other globally agreed upon policy instruments, including the United Nations Decade on Ecosystem Restoration (2021– 2030). Moreover, the FLR circular continuum of the six guiding principles and 32 guiding elements, following one after another, should prove to be of considerable help in re-imagining the future of forests and deciding how we restore and manage our forest landscapes in a post-COVID-19 world.

1.3 KEYNOTE ADDRESS

Best Practices Approaches in Forest-Related Ecosystem Restoration


Dr. Michael Kleine (Photo by Pilar Valbuena, Global Landscapes Forum)

Speaker

Dr. Michael Kleine, Deputy Executive Director and Coordinator of the Special Programme for Development of Capacities, International Union of Forest Research Organizations (IUFRO)

Moderator

Dr. Promode Kant, Director, Institute of Green Economy, Gurgaon, India

Rapporteurs

- Dr. Shakti Singh Chauhan, Director, Indian Plywood Industries Research & Training Institute (IPIRTI), Bangalore of India
- Mr. Komsan Rueangritsarakul, Forestry Technical Officer, Royal Thailand Forest Department of Bangkok

Dr. Michael Kleine referred to forest landscape restoration (FLR) as a planned process to regain ecological integrity and enhance human well-being in deforested or degraded landscapes. It is a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use of forest ecosystems in an equitable way. With all their cultural diversity, local communities living within and in proximity to forests are treated as an integral part of these ecosystems. FLR is not an end in itself but a means of regaining, improving, and maintaining vital ecological and social functions, leading to more resilient and sustainable landscapes in the long term.

Given the level of degradation of forests and land around the world, restoration as called for by the UN Decade of Ecosystem Restoration, Bonn Challenge, and various regional initiatives is a global answer to climate change (Paris Agreement), loss of biodiversity (post-2020 biodiversity framework), and land degradation under the UNCCD-land degradation neutrality targets. All these initiatives serve, in one way another, to achieve the Sustainable Development Goals.

> *"FLR is more than just planting trees. It is restoring a whole landscape to meet future and present needs and to offer multiple benefits and land uses over time."*

The core principles of a landscape approach to forest restoration are addressing common concerns, entry point activities, continual learning, adaptive management, multiple-scale, multi-functionality, multi-stakeholder, negotiated and transparent change logic, clarification of rights and responsibilities, participatory and user-friendly monitoring, resilience, and strengthened stakeholder capability.

In terms of implementation related to forests, it may include an increase in forest or tree cover, enrichment of stand structure and composition, and application of non-degrading management practices. Although largely concerned with trees, the entire landscape crossing watersheds and jurisdictions, including land-use mosaics, remains in focus at all times in order to bring back biological productivity and sustain ecosystem services for society.

Important phases in FLR are envisioning national or landscape-level goals, conceptualizing local objectives, planning activities for achieving the local and landscape-level objectives, and sustained monitoring and feedback. Thus, implementing FLR at various scales is a cyclic process with constant feedback loops between conceptualization, implementation, and impact assessment, gradually transforming a currently degraded landscape into a future-restored sustainably managed landscape, as shown in Figure 4.

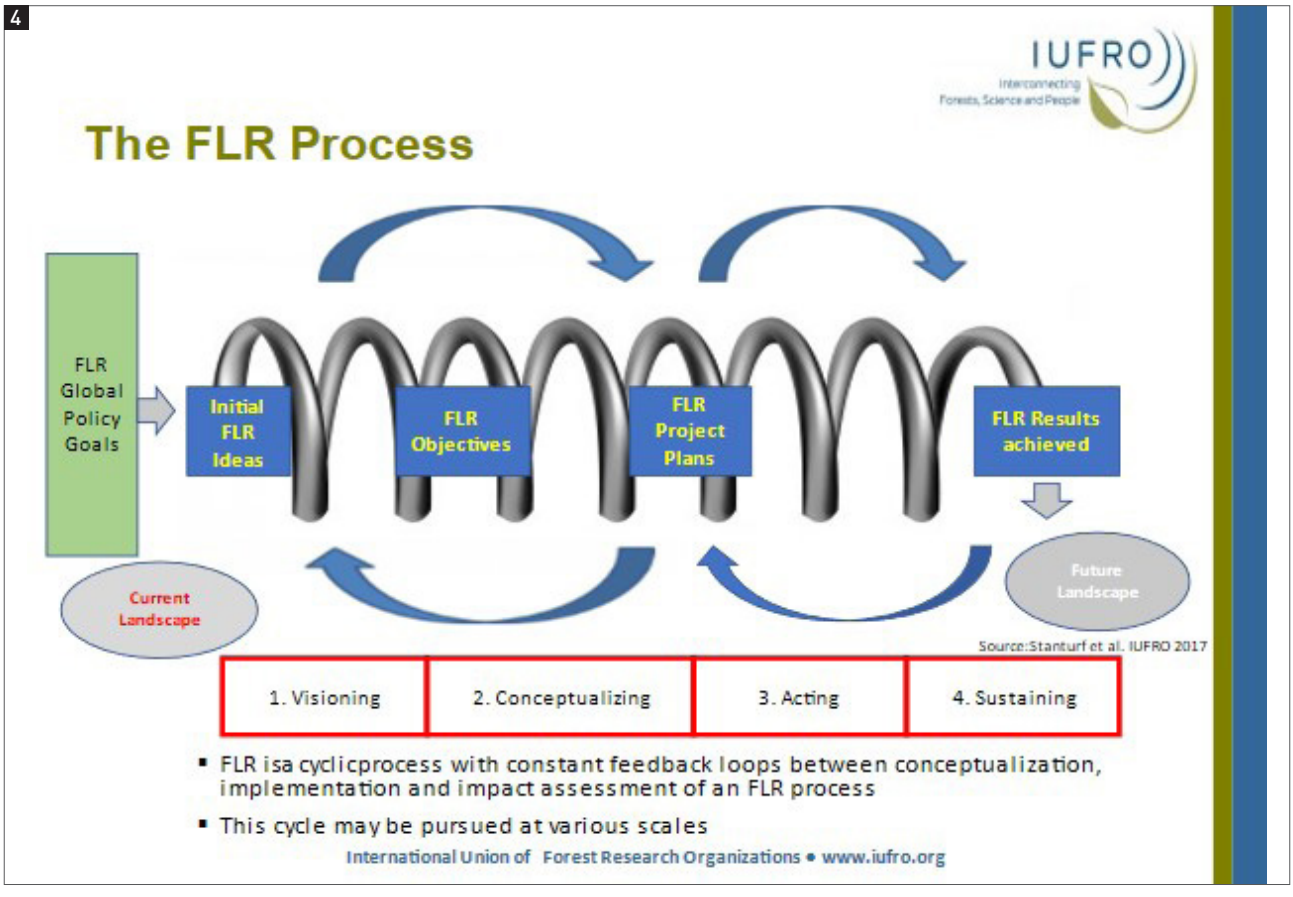


Figure 4: FLR implementation process – based on Project Cycle Management
(In: Stanturf et al. 2017)

Operating the FLR process as a participatory undertaking involving all relevant stakeholders includes activities such as informing and sharing experiences, jointly setting objectives and deciding on actions, motivating stakeholders, organizing and steering implementation, and monitoring achievements and impact, as illustrated in Figure 5.

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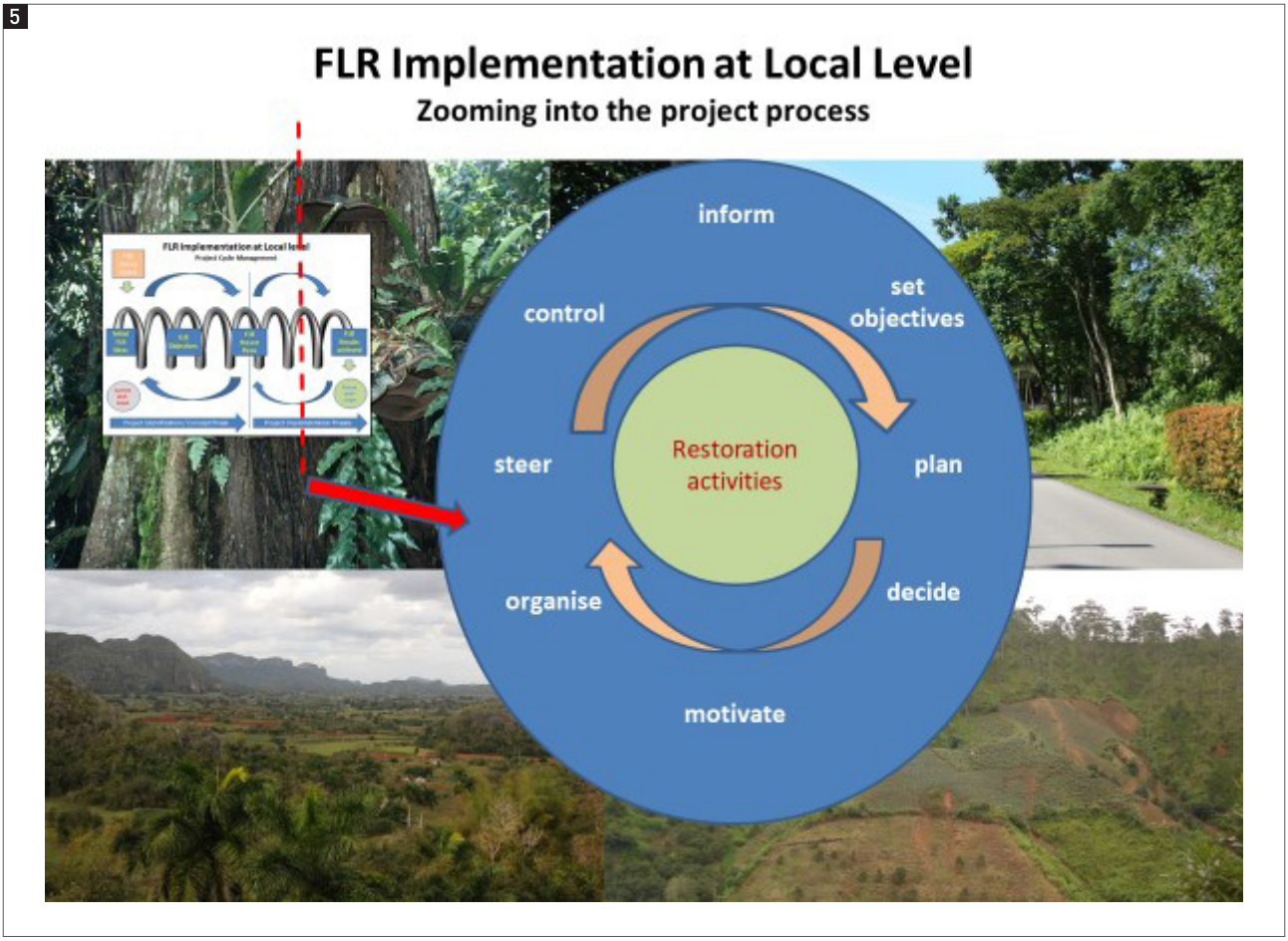

Figure 5: FLR Implementation at the Local Level - Project Cycle Management
(In: Stanturf et al. 2017)

Important points to consider when setting the vision for forest landscape restoration are the scale of the project, the context by way of Nationally Determined Contributions (NDCs) under the Paris Agreement and other global and national policy goals, baseline status of degradation, and the delineation of ecological and social goals with full involvement of local communities. Then, for conceptualizing FLR, the priorities for units within the selected landscape are settled, broad goals are broken into a set of well-defined local restoration objectives that stakeholders actively support, and causal connections for proceeding from stage to stage are laid out.

Based on the concept stated above, a detailed plan for FLR is developed with the fullest possible stakeholder involvement, seeking to answer the following questions:

What will be done?

Where will it be done?

When will it be done?

By who will it be done?

At what cost and with whose resources will it be done?

Sustaining FLR is as important as the work of restoration itself. This involves continual monitoring, adaptive management, evaluation, and using the knowledge generated in further developing capacities of the implementing agencies and local communities. Tailoring FLR training efforts to specific audiences, including those in the landscape governance space, as well as implementation on the ground and facilitating FLR, is a promising approach to effectively building the necessary capacities.

In conclusion, Dr. Kleine emphasized that restoration is not a mere biophysical action on land but an intervention into a social-ecological system with the active and full involvement of the communities concerned. There will often be disagreements about concepts, but such discord should lead to enhanced efforts to find solutions and not prevent swift and decisive action on the ground. Restoration is not an end in itself but a means to achieve resilient landscapes beneficial to both people and nature. Restoration actions at all levels must contribute to building a socially just, climate-neutral, and nature-positive world.

> *"The ultimate goal of FLR is to create a socially just, climate-neutral, and nature-positive world"*

1.4 KEYNOTE ADDRESS

Financing Forest Landscape Restoration

Speaker

Mr. Jerry Velasquez, Director, Division of Mitigation and Adaptation, GCF

Moderator

Dr. Promode Kant, Director, Institute of Green Economy, Gurgaon, India

Rapporteurs

- Mr. Cris Angelo Vispo, Senior Forest Management Specialist, Forest Resources Conservation Division, Forest Management Bureau of Philippines
- Mr. Sya'roni Agung Wibisono, Head of Subdivision of Multilateral Cooperation II, Bureau of International Cooperation, Ministry of Environment and Forestry of Indonesia

Initiating his talk, Mr. Jerry Velasquez noted the enormous costs involved in financing FLR with as much as a quarter of the world's land area degraded over the past half-century, restoration will require about $6.3 trillion a year, or 8.3% of the global GDP in 2016. Restoring degraded forests means recreating the Earth's regenerative capacities with extraordinary benefits beyond carbon sequestration and storage and climate mitigation benefits, as shown in Figure 7. Every dollar invested in restoration generates an estimated $7–30.

> *"Most FLR activities contribute to mitigation and adaptation of climate change."*

With regards to climate change mitigation benefits alone, experts estimate that achieving the Bonn Challenge of restoring 350 million ha by 2030 could sequester up to 1.7 $GtCO_2e$ per year. Restoration does not necessarily mean only tree planting; even setting aside lands for natural forests without active restoration efforts across the globe would store several times more carbon than plantations and agroforestry. However, restoration requires money and there is a clear funding gap of $300 billion per year, most of which is in developing countries. The global financial community must find ways to meet this need.

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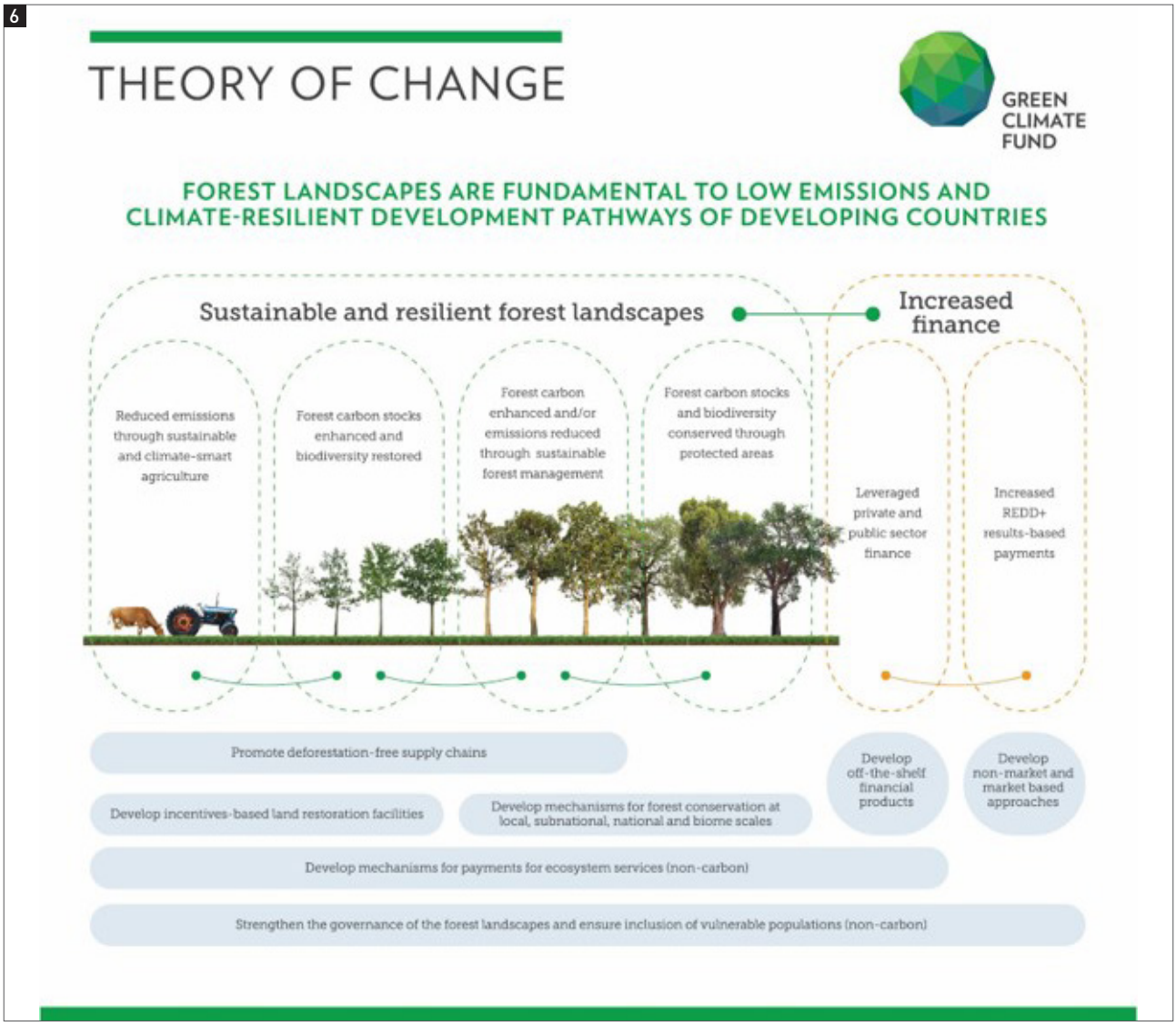

Figure 6: Theory of Change Towards Sustainable and Resilient Forest Landscapes
(Source: Green Climate Fund)

Globally, the largest amount of funds for FLR come from domestic sources. Still, in the case of developing countries, particularly the Least Developed Countries, international sources must provide most of the funding needed for FLR. Financing sources, both domestic and international, provide either public or private funds, and increasingly a blend of them. Public domestic financing is derived from tax revenues, which provides greater stability and predictability. It is essentially a redistribution of tax revenues through subsidies or result-based payments for FLR-related work. Since early 2020, a sharp drop in tax collections due to COVID-19 has restricted the availability of domestic public finance.

Private domestic financing for forest plantations by timber-producing companies is well known. With increased demand for timber in many countries, including China and India, it is not difficult for timber companies to access capital markets to raise money. Institutional investors are usually financial intermediaries like pension funds, insurance companies, mutual funds, etc. They may provide money for commercial forest ventures that promise attractive returns over the medium- to long-term as it helps diversify their portfolios. But aversion to low returns and risk, as well as unclear policies, laws, and tenure confusions in developing countries, have so far greatly limited such investments.

Initiatives to help increase private sector involvement in SFM include Private Sector Set-Asides (PSSAs) as part of Climate Investment Funds, providing concessional financing on a competitive basis to projects that engage the private sector in sustainable forestry. Another instrument is the Coalition for Private Investment in Conservation (CPIC), a global multi-stakeholder initiative to attract investment capital to create positive conservation and financial outcomes synergistically. The European Investment Bank leads the CPIC working group on forest landscape conservation and restoration and has issued model blueprints for investment in forest landscapes that aggregate multiple revenue streams. Philanthropic organizations such as the Betty and Gordon Moore Foundation, Bill & Melinda Gates Foundation, and the Ford Foundation also provide significant amounts of financing that could support FLR.

Public international finance for FLR in developing countries is available at the national level (bilateral) from organizations like USAID, JICA, GIZ, UK DFID, Australian Aid, etc. as well as the supra-national level (multilateral) from ADB, World Bank, GEF, European Investment Bank, GCF, etc.

Co-financing and blended financing are other useful options because public finance, by way of guarantees, equity, or otherwise creating an enabling environment, can attract private finance. In addition, co-financing by national governments is often a condition for multilateral finance for long-term development projects.

The best and most appropriate sources of financing for FLR will depend on a variety of factors, such as the financial capability of countries and whether FLR activities will store carbon or increase resilience, whether they are transformative, whether they will generate significant amounts of income, and whether short or long-term financing is needed.

As the operating entity of the UNFCCC's financial mechanism, the Green Climate Fund (GCF) mandate is to help developing countries limit or reduce their greenhouse gas emissions and adapt to climate change. The GCF seeks to promote a "paradigm shift" to low-emission and climate-resilient development pathways, taking into account the needs of nations that are particularly vulnerable to climate change impacts and making large-scale and transformational changes to help countries develop economically while addressing climate change.

The GCF aims at delivering equal amounts of funding to mitigation and adaptation efforts, while being guided by UNFCCC principles and provisions. Key features of GCF financing are its country-driven approach, its focus on the impact on climate change mitigation and adaptation, its constant search for projects that have the potential for a paradigm shift, and a dedicated facility for financing climate impact activities in the private sector. In addition, three of its eight investment impact focus areas — namely forests and land-use, livelihoods of people and communities, and ecosystems and ecosystem services — relate well to the range of activities admissible under FLR.

The GCF encourages transformational planning and programming by promoting integrated strategies, planning, and policymaking to maximize the co-benefits between mitigation, adaptation, and sustainable development. The Fund also seeks to catalyze climate innovation by investing in new technologies, business models, and practices to establish proof of concept. For instance, GCF is currently supporting the development of the first Caribbean regional green bond exchange in Jamaica. Another focus area is de-risking investment to mobilize finance at scale by using scarce public resources to improve the risk-reward profile of low-emission climate-resilient investment and crowd-in private finance. An example is $150 million in GCF first-loss equity investment in partnership with Pegasus Capital Advisors, which will leverage investments of up to 25:1 for climate action at the sub-national level.

Mainstreaming climate risks and opportunities into investment decision-making to align finance with sustainable development is yet another important approach by the GCF. It is done by promoting methodologies, standards, and practices that foster new norms and values. For example, the GCF is developing new valuation methodologies, enabling investors to balance the higher upfront costs of climate-resilient infrastructure and perceived higher technology risks with lower operating costs and lower climate physical and transition risks. This could unlock private finance scale through instruments such as resilience bonds.

Climate change offers businesses an unprecedented chance to capitalize on new growth and investment opportunities that can protect the planet as well. GCF employs part of its funds to help mobilize financial flows from the private sector to compelling and profitable climate-smart investment opportunities.

The Fund is available through five funding windows, each with a specific focus — (i) readiness funding, (ii) project preparation facility, (iii) funding proposals, (iv) requests for proposals, and (v) simplified approval process. To enable developing countries to create high-quality proposals, the GCF makes available a grant of $1 million to each country every year under the funding window of the project preparation facility, and even permits withdrawal from this fund in advance for three years, that is, a maximum grant of $3 million in one go.

As of July 2021, the GCF portfolio worldwide had $8.8 billion in project investments in 121 countries and $338 million in readiness activities in 140 countries, of which $3.32 billion in projects and $100.3 million in readiness is in the Asia-Pacific region. Since then, a further $1.2 billion has been approved, bringing the total amount of GCF funds under management to over $10 billion.

An important GCF investment in this region is the “Bhutan for Life” program to conserve Bhutan’s protected areas that constitute more than half of its national land area. The paradigm shift is part of efforts to achieve carbon neutrality at the national level. The total project cost is $118.3 million, of which GCF financing constitutes $26.6 million (22.5%). This project with a life span of 14 years was approved in 2017 through WWF as an accredited entity.

Another example of GCF funding in the Asia-Pacific is the REDD+ Readiness Project in Lao PDR, which aims to enhance forest policy and deforestation-free agriculture for REDD+ Readiness. The paradigm shift expected is an integrated cross-sectoral approach to forests and agriculture across the country. The primary focus of the project is on climate change mitigation. The total project cost is estimated at $73 million, of which the GCF grant is $17.1 million (23.4%). The accredited entity is GIZ.

PROJECT **$8.8B in 121 countries**
READINESS **$338M in 140 countries**

As a guide to the participants of this workshop looking to access funds for FLR in their countries, the GCF advises proceeding as follows:

01. Begin by researching your country's Nationally Determined Contributions (NDCs) under the Paris Agreement because the GCF often finances proposals in line with the country's NDCs.

02. Participate in your country's project origination program of the GCF through the National Designated Authority (NDA) of your country under the UNFCCC.

03. If necessary, seek up to $1 million under GCF's Project Preparation Facility through the NDA.

04. Decide the purpose of the restoration, whether it is flood control, soil and moisture conservation, timber harvest, NWFP, etc., or a combination of many purposes, bearing in mind that to ensure GCF eligibility the primary purpose must either be mitigation, adaptation, or both.

05. Examine whether it would be cheaper to conserve than to restore.

06. Decide on the scale of landscape that you would like to bring under the project.

07. Decide on the strategy to maintain landscapes over the long term once they are restored.

08. Reach out to a GCF accredited entity (FAO, UNDP, UNEP, ADB, JICA, GIZ, KfW, etc.) to help you develop the project proposal.

02

LECTURES

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2.1 LECTURE

Overview of FLR and Restoration Opportunities Assessment Methodology (ROAM): A case study on the use of ROAM in Viet Nam

Speakers

Dr. Scott Perkin, Head of Science and Strategy Group, IUCN Asia Regional Office

Mr. Jake Brunner, Head of Indo-Burma Group, IUCN Asia

Moderator

Dr. Promode Kant, Director, Institute of Green Economy, Gurgaon, India

Rapporteurs

- Mr. Hort Sothea, Deputy Director, Department of Wildlife and Biodiversity, Forestry Administration of Cambodia
- Ms. Nguyen Thuy My Linh, Executive manager of Environment and Climate Change Faculty, Research Institute for Forest Ecology and Environment (RIFEE) (under Viet Namese Academy of Forest Sciences - VAFS) of Viet Nam

> *"FLR is about restoring ecosystem functionality and productivity, not original forests."*

Introducing the audience to Forest Landscape Restoration (FLR), Dr. Scott Perkin stated that globally 2 billion hectares of degraded and deforested land could benefit from restoration. Traditional reforestation practices, usually in large-scale plantations with timber production as the primary objective, has produced only a handful of commercially useful and often exotic species delivering only limited biodiversity, ecosystem services, and livelihood benefits. The concept of FLR has evolved to recognize the complex nature of the relationship between societies, forests, and the environment and the need for integrated approaches leading to better-managed landscapes. The goal of FLR is to enhance native ecosystem functions and bring back ecological and economic productivity without causing any loss of natural forests, grasslands, or other ecosystems.

There is no single typical FLR intervention. Rather, FLR strategies use a suite of complementary land-use interventions that come together under a common framework such as assisted natural regeneration, planting forests and woodlots, mangrove and coastal restoration, watershed protection, erosion control agroforestry, adoption of improved silvicultural practices, and prescribed burnings, among others.

The Restoration Opportunities Assessment Methodology (ROAM) offers a way to turn Bonn Challenge pledges into reality. It is a flexible, affordable, and participatory framework developed by IUCN and WRI, specifically to identify restoration sites and priorities. It can help governments identify priority landscapes for restoration, estimate the costs and benefits of different restoration strategies and opportunities, lay the foundation for restoration strategies, provide often-missing landscape-level data, and build high-level support for restoration.

Some challenges for the growing FLR movement are in financing the rapidly expanding FLR activities, incentivizing FLR over alternate use of degraded lands, scaling up successful FLR projects, deciding on the role of the private sector and civil society in FLR, and monitoring progress in a transparent, credible, and cost-effective way.

In the second part of the lecture, Mr. Jake Brunner of IUCN presented the case of Forest Landscape Restoration Assessing opportunities in Quang Tri Province, Viet Nam. IUCN selected the site using ROAM for its overall ambition and demonstrated a commitment to forest restoration. The FLR goals for this landscape were increasing forest biodiversity and quality, conserving and enhancing ecosystem services, and improving livelihoods to reduce the incentives to encroach on forests.

Quang Tri province, with an area of 4739 km^2 located in north-central Viet Nam, has a population of 600,000 and is populated by the Kinh ethnic group, with most living in rural areas. It is one of the poorest provinces in the country, with an average annual household income of only $575. The province's forests were devastated during the war in the 1960s and 70s and were replanted with fast-growing exotic Acacia species after the economic reform of the 1990s.

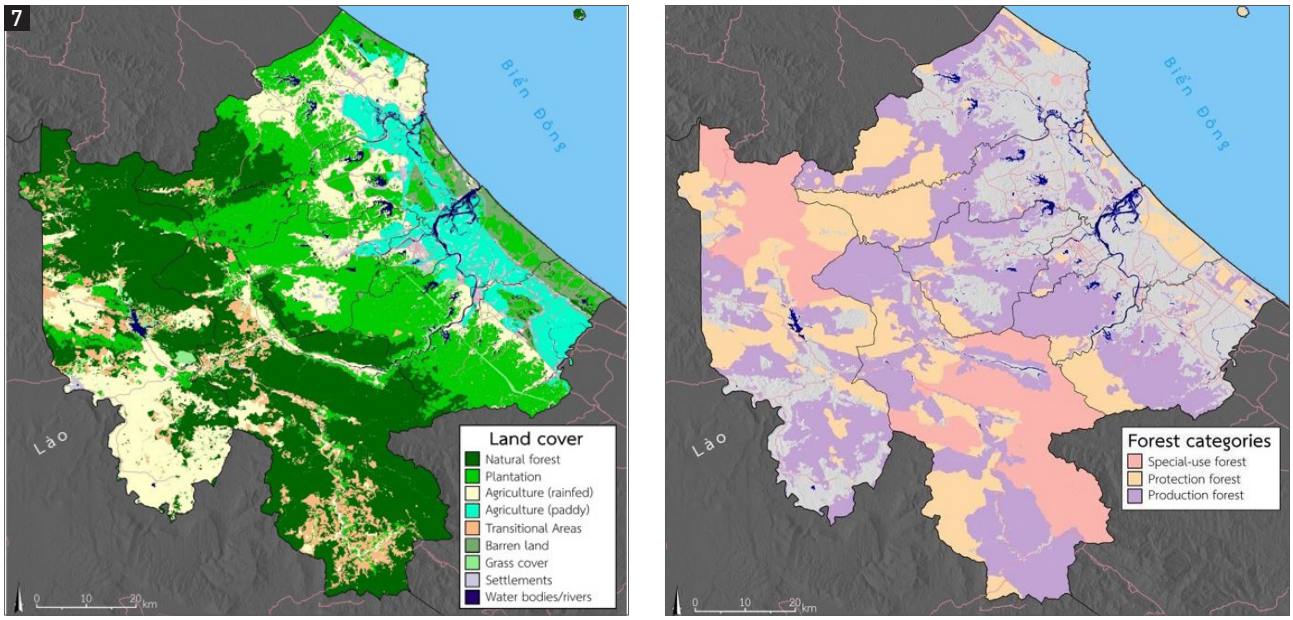


Figure 7: Map of Land Cover (Left) and Forest Categories (Right) in Quang Tri Province, Vietnam

Figure 7 (left) shows nine types of land cover, of which two are forests. The figure on the right shows the three legally recognized categories of forests: special-use forests, protection forests, and production forests. The FLR options considered were Enrichment Planting and Assisted Natural Regeneration (EP-ANR), Extended Rotation (ER), Native Species Introduction (NSI), and Soil and Water Conservation (SWC).

01 **Enrichment Planting and Assisted Natural Regeneration (EP-ANR)**	Improve forest quality and biodiversity Reduce erosion degraded forest Improve water quality An alternative source of income for farmers/landholders (PES)
02 **Extended Rotation (ER)**	Erosion control by reducing the amount of time land is bare after harvesting Improve water quality of river basins Increase incomes through high-quality certification on forests that provide timber
03 **Native Species Introduction (NSI)**	Erosion control by reducing time land is bare after harvesting Improve water quality river basins Increase incomes through high-quality timber-providing forest certification Increase biodiversity
04 **Soil and Water Conservation (SWC)**	Prevent erosion by conserving high-quality soil on farm plots Prevent water runoff and improve water retention for crops Increase yields

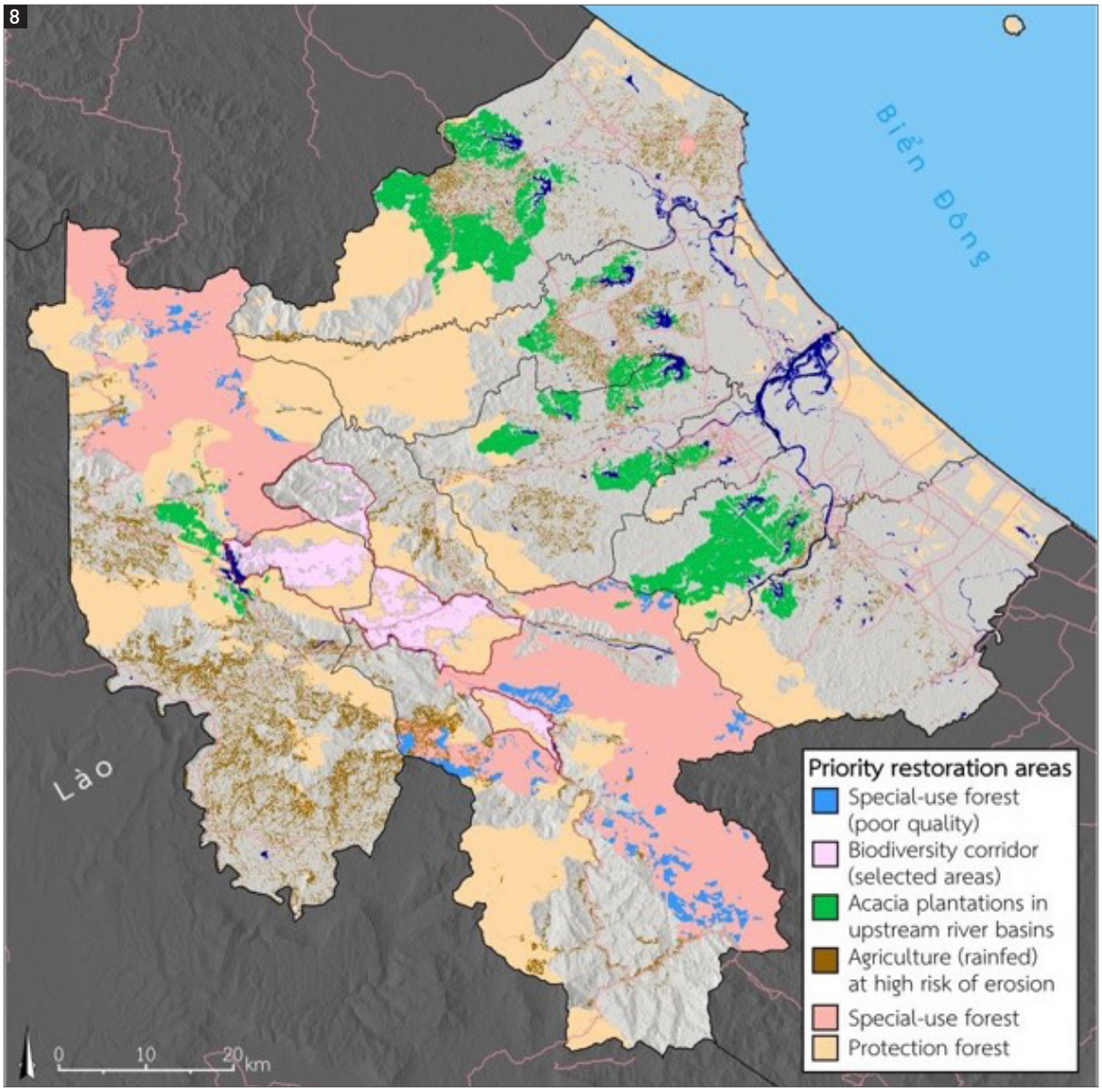


Figure 8: Map showing the Priority of Forest Restoration Areas in Quang Tri Province, Vietnam

Using ROAM, restoration areas were identified in the order of priority, as shown in the Figure 8 above. The FLR options considered best-suited for a total area of 54,000 ha within the province are noted below:

1. EP-ANR in poor quality parts of special-use forests, with the support of PES (6,303 ha)
2. EP-ANR in poor quality forest and other lands to be converted into a biodiversity corridor (9,879 ha)
3. SWC in rainfed agriculture at high risk of erosion, with special attention for cassava areas (24,975 ha)
4. ER-NSI with forest certification for acacia plantations held by large landholders (9,541 ha)
5. ER-NSI with forest certification for family-held acacia plantations of a size >10 ha (1,332 ha)
6. ER with forest certification for family-held acacia plantations of size 3-10 ha (2,660 ha)

In conclusion, a total of 54,000 ha, or 11% of the province, was selected to restore in the specific manner noted above.

2.2 LECTURE

Safeguards and Free, Prior, and Informed Consent (FPIC) in REDD+

Speaker

Dr. Nguyen Quang Tan, Country Coordinator,
CIFOR- ICRAF, Viet Nam Country Program

Moderator

Dr. Promode Kant, Director, Institute of Green Economy, Gurgaon, India

Rapporteurs

- Ms. Cao Thi Thu Hien, lecturer, researcher, Forest Inventory and Planning Department, Silviculture Faculty, Viet Nam National University of Forestry
- Ms. Deborah Sue, Director, Forest Resource Assessment & Conservation Ministry of Forestry of Fiji

Introducing the subject, Dr. Nguyen Quang Tan said that according to Decision 1/16.CP (Appendix I) of the UNFCCC, the following safeguards (also known as Cancun Safeguards) in the planning and implementation of REDD+ must be strictly observed:

- Actions should be consistent with the objectives of national forest programs and relevant international conventions and agreements;
- Transparent and effective national forest governance structures;
- Respect for the knowledge and rights of indigenous peoples and members of local communities;
- Full and effective participation of relevant stakeholders, in particular, indigenous peoples and local communities;
- Activities undertaken should be consistent with the conservation of natural forests and biological diversity, ensuring that REDD+ actions are not used for the conversion of natural forests but to incentivize the protection and conservation of natural forests and their ecosystem services and enhance other social and environmental benefits.
- Actions to address the risks of reversals;
- Actions to reduce displacement of emissions.

Free and prior informed consent (FPIC) is an important aspect of these safeguards. It amounts to the recognition that the right of determining what is good for the local people lies with the people themselves. It provides a locally and culturally specific process to guarantee the rights of local people, premised on the understanding that they have the right to negotiate the conditions for any proposed project that will directly impact their lifestyle or livelihood, including their right to use the land and its resources. Local people can accept or reject a proposed project, and they can define the conditions and negotiate the terms to accept or reject the proposed project. As local people often lack the political power to voice their opinions and make themselves heard, FPIC provides opportunities and mechanisms to respect their fundamental rights to voice their opinion about a proposed project.

Free

'Free' in FPIC means that the decisions made in the FPIC process should be free from any pressure, force, manipulation, or intimidation by any individual, company, organization, or government.

Prior

'Prior' means the consent has been sought sufficiently in advance of the project authorization and well before any resources, such as finances, equipment, or labor, are allocated to the project. It also refers to the need to take into consideration the time required to arrive at the consent sought, because allowing enough time for local people to analyze and seek additional information is crucial for good decision-making.

Informed

'Informed' means that local people are given complete, correct, and clear information in their preferred language, which includes the scope, objectives, duration, human and financial resources involved in the proposed project, the land area to be affected, and the FPIC process to be followed. The information provided must be neutral, and a third party should ideally facilitate the information-sharing process.

Consent

'Consent' is not merely consultation. It means the local people have the right to accept or reject the proposed project. Full participation of local people, especially those who will be affected by the proposed project, is required to obtain the consent of the local people. The form of consent and who gives it may vary depending on how project implementation impacts the different sub-groups of local communities.

The legal basis for FPIC is provided by the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), UN Declaration on the 'Right to Development,' Article 6 of the Convention concerning Indigenous and Tribal Peoples in Independent Countries, and the Convention on Biological Diversity. Under the UN-REDD policy on FPIC, the National Implementing Partner is responsible for seeking consent. The consent is to be obtained from local communities and indigenous people affected by the activity in question. In addition, consent should be obtained from other forest-dependent communities that have customary and legal rights to the territory and resources that the activity will affect.

Within the scope of the UN-REDD Viet Nam Programme, FPIC was piloted between January and June 2010 in two districts of Lam Ha and Di Linh of Lam Dong province, covering 78 villages in three phases. Phase 1 in April 2010 covered a total of 22 villages, and was followed by Phase 2 in May 2010 which covered 31 villages. and finally, Phase 3 in June 2010 covered 25 villages. Despite no prior experience with FPIC in the country, the process was very encouraging, and progressive improvement was noticed from phases 1 to 3. However, the speed of implementing the FPIC process was a concern as there was very little time for internal discussions among local communities. Although various means of communication were used, some information could not be provided, particularly due to potential risks and costs associated with the program.

2.3 LECTURE

Stakeholder analysis for FLR intervention with a case study: Empowering local communities for the restoration of a coastal landscape in the Ayeyarwady Delta, Myanmar

Speakers

Mr. Ronnakorn Triraganon,
Senior Strategic Adviser, RECOFTC;

Dr. Maung Maung Than,
Country Director, RECOFTC Country Office in Myanmar

Mr. Aung Kyaw Naing,
Community Forestry Partnerships Coordinator, RECOFTC Country Office in Myanmar

Moderator

Dr. Hwan Ok Ma, Project Manager of ITTO

Rapporteurs

- Mr. Asep Sukmana, Researcher, Forest Research and Development Center, Ministry of Environment and Forestry of Indonesia
- Ms. Nway Mon Mon Aung, Staff Officer, Forest Department of Myanmar

Introducing the subject, Mr. Ronnakorn Triraganon, Senior Strategic Adviser, RECOFTC, said stakeholders include all individuals, groups of individuals, organizations, and government departments that are directly or indirectly affected, or may be affected at some time in the future, by the project or an FLR initiative. And the task in stakeholder analysis is to draw out the interests and influence of stakeholders, identify relationships between stakeholders and their conflicts of interests, and assess the appropriate type of participation by different stakeholders. This is done to make FLR more sustainable over time.

Stakeholder analysis is carried out both at the landscape level and the village level. Different stakeholder groups at the landscape level are identified, and their roles, influences, and interests in the project are explored deeply. The outcomes are then utilized in the overall project management. In village-level analysis, different groups and individuals with different livelihoods are identified, and their roles, influences, and interests in the community forests are explored. The findings are then used in the community forest management plan.

RECOFTC carried out one such analysis in the project on "Empowering local communities for the restoration of a coastal landscape in the Ayeyarwaddy Delta, Myanmar." Key stakeholders included local communities in Pyarpon township, government departments, private sector entities like the marine product industries, and civil society organizations. Most stakeholders were interested in forest restoration but were of the view that tenure and management conflicts with the forest department discouraged active cooperation in restoration efforts. Civil society organizations showed high interests in forest restoration and were willing to coordinate between local communities and government departments for this purpose.

At the village level, key stakeholders were Community Forestry User Group (CFUG) members as well as villagers who were not members of any such group, such as religious leaders, village leaders, persons with big influence locally, women, youth, and minorities living in the village. Since different stakeholder groups often have different interests, multiple interests had to be accommodated in management plans to avoid resource-use conflicts. As their livelihoods were directly or indirectly related to mangrove forests, most community members were keen on restoring mangrove forests.

Their overall findings were as follows:

i. Forest restoration must provide attractive incentives for the local community to engage in restoration.

ii. Forest restoration in degraded land takes a long time, but local communities expect quicker returns.

iii. Local people feel insecure about their rights for livelihood development from forest restoration interventions.

iv. Effective forest restoration requires contributions from stakeholders, including marginalized people, in decision-making.

v. Capacity-building support on various aspects is one of the key factors for success.

vi. Formalization of rights and tenure, development of livelihood opportunities, and enhancement of key capacities are important. If these are not secured, it is not possible to sustain FLR over the long term.

2.4 LECTURE

Logical framework (SMART Indicators) for FLR intervention

Speaker

Mr. Orlando A. Panganiban, Director of CPD, AFoCO Secretariat

Moderator

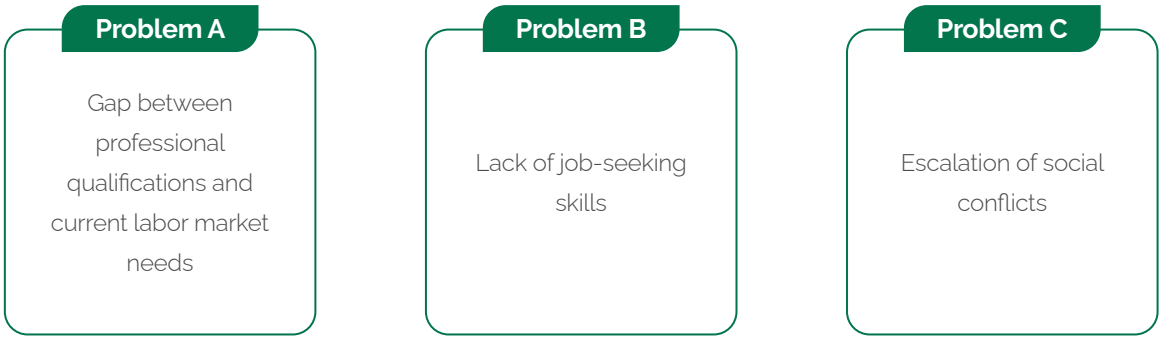
Ms. Soozin Ryang, Program Officer, AFoCO Secretariat

Rapporteurs

- Mr. Albino da Silva Barbosa, Technical Officer GIS of Timor Leste
- Mr. Arnas Auganbayev, Deputy Director of the Katon-Karagay State National Natural Park, Ministry of Ecology, Geology and Natural resources of the Republic of Kazakhstan

A precise definition of a problem is important in designing and implementing a project. A project is a self-contained operation with a coherent set of activities to achieve clearly defined objectives, solving problems of identified target groups with planned tangible results and a limited timeframe.

Once all problems associated with the focal problem are defined, one should carefully analyze each one of them, determine the cause-effect relationship between them, and then present them in a way where the problem-cause is shown a level below its problem-effect. Problems not in direct cause-effect relation are shown on the same level. As an example, consider the Focal Problem: "unemployment among young inhabitants of the region." Note the Focal Problem must not contain its solution. The associated problems are the gap between professional qualifications and current labor market needs, lack of job-seeking skills, and escalation of social conflicts.



Problem A and B are the causes for the **Focal Problem**; hence they should be positioned below it. They are not interconnected, so they should be positioned at the same level. Problem C is an effect of the Focal Problem and, indirectly, of Problem A and B, so it should be positioned above it.

It should be remembered that a Problem Tree is not a hierarchical structure. The position of a Problem in the Problem Tree does not show its importance.The project stakeholders should be involved in Problem Tree preparation. It should be a group process with the involvement of as many experts and stakeholders as practical. If a Core Problem is at the highest level, it is necessary to check whether the problem can be fully solved. If not, and it is only somehow partially contributing to the solution of the problem, one should redefine it.

If the Problem Tree is defined correctly, one needs to go only one step down and put the main problem on the level of the overall objective, i.e., the problems that can be solved during the project realization will become specific project objectives. Remember that the Problem Tree is an open logical structure linked to the stakeholder analysis matrix. Both the Problem Tree and stakeholder analysis matrix allow continuing development, transformations, and adjustments. They must be checked and revised at every phase of the project development process. Therefore, it can be used as the basis for the development of several projects.

Each card or box in the problem tree shall include only one problem, and the problems must be real, not hypothetical. Avoid defining the problem in the form of negation of the solution (for example, lack of firefighting equipment and training). Instead, make sure of the sequence of causes and effects; that is, problem-effects stem from problems-causes.

To create an Objective Tree, one must first establish a "positive" statement based on the Problem Tree, using the levels created for the Problem Tree. This will result in the creation of an Objective Tree based on the Problem Tree. The focal problem level will turn into the specific objective, the problems above into overall objectives, and the problems below into results.

2.5 LECTURE

Carbon benefit analysis for FLR intervention

Speaker

Prof. Nophea Sasaki, Professor in the School of Environment, Resources and Development (SERD), Asian Institute of Technology, Thailand

Moderator

Dr. Promode Kant, Director, Institute of Green Economy, Gurgaon, India

Rapporteurs

- Dr. Ho Wai Mun, Research Officer, Forest Research Institute Malaysia (FRIM)
- Mr. Niwat Phupasuk, Forestry Officer, Royal Forest Department of Thailand

Across the globe, the total area of degraded forests stands at around 930 million ha, of which 420 million ha has been lost over the last 30 years since 1990. Taking an average loss of 500 tCO_2 per ha, the total amount of emissions from forests amounts to 211 billion tCO_2, which also translates to about 23% of all carbon stocks in tropical forests. Carbon emissions from degradation are about a quarter of the carbon emissions from deforestation. Deforestation and forest degradation impact about 1.6 billion people, who can find new hope in the New York Declaration on Forests (NYDF) that seeks to restore 350 million ha of degraded forests by 2030.

It is interesting to speculate how many carbon credits we could earn and what the monetary value would be if we can restore all 930 million ha of degraded forests. Of this, 350 million ha will hopefully be restored by 2030 as envisaged under the NYDF. If the rest can be achieved by the year 2060, then we could be well on the path to limit global warming within the more ambitious target of 1.5°C of the Paris Agreement.

In a research model, this target can be achieved when a major part of the degraded land (56%) is restored by planting native species for biodiversity conservation, watershed protection, and timber production. These species could include, among others, Casuarina spp., *Dalbergia sissoo, Gmelina arborea, Swietenia macrophylla,* Terminalia spp., *Tectona grandis,* and other hardwoods, 10% of which would be harvested in the 30th year for timber production. Over the rest of the degraded lands, fast-growing species harvestable in the seventh year for pulpwood production — like eucalyptus, pines, acacias, and others — would be planted (see Figure 9 on the next page).

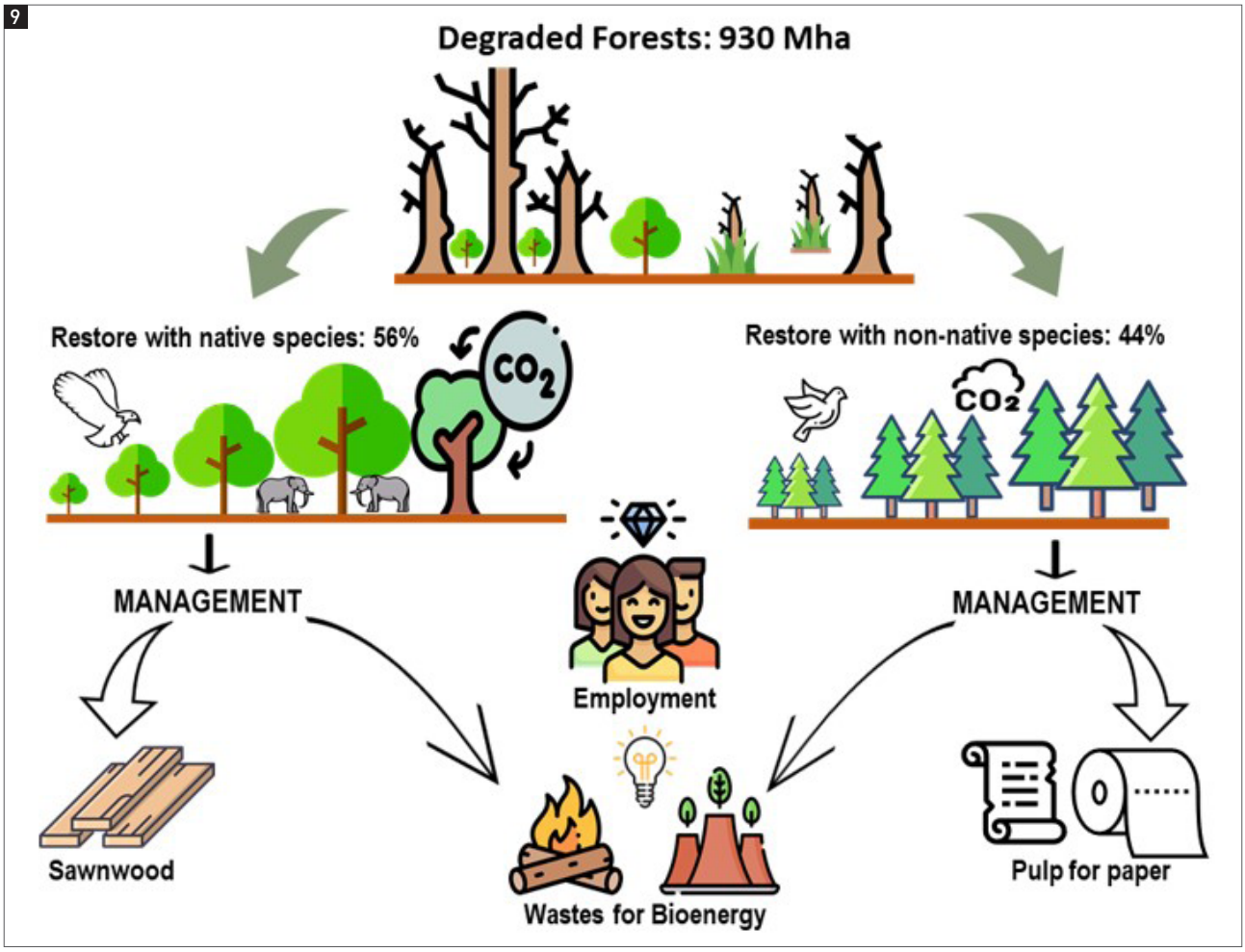


Figure 9: Restoration and Management Scheme

Using IPCC default values, it is estimated that the fast-growing species will quickly reach carbon stocks of 170 $MgCha^{-1}$ and then increase very slowly (see Figure 10). But when harvested every seventh year, they will reach an average of 100 $MgCha^{-1}$, drop to near zero on harvest, and then rise again to the same average carbon content in the seventh year. Native hardwood species would, on the other hand, slowly rise to average carbon storage of 150 $MgCha^{-1}$ and then stay at that level. Thus, the harvest of 10% of trees would cause a small dip for a short period, which would be covered quickly by increased biomass growth as more silviculture space becomes available to the remaining 90% of trees.

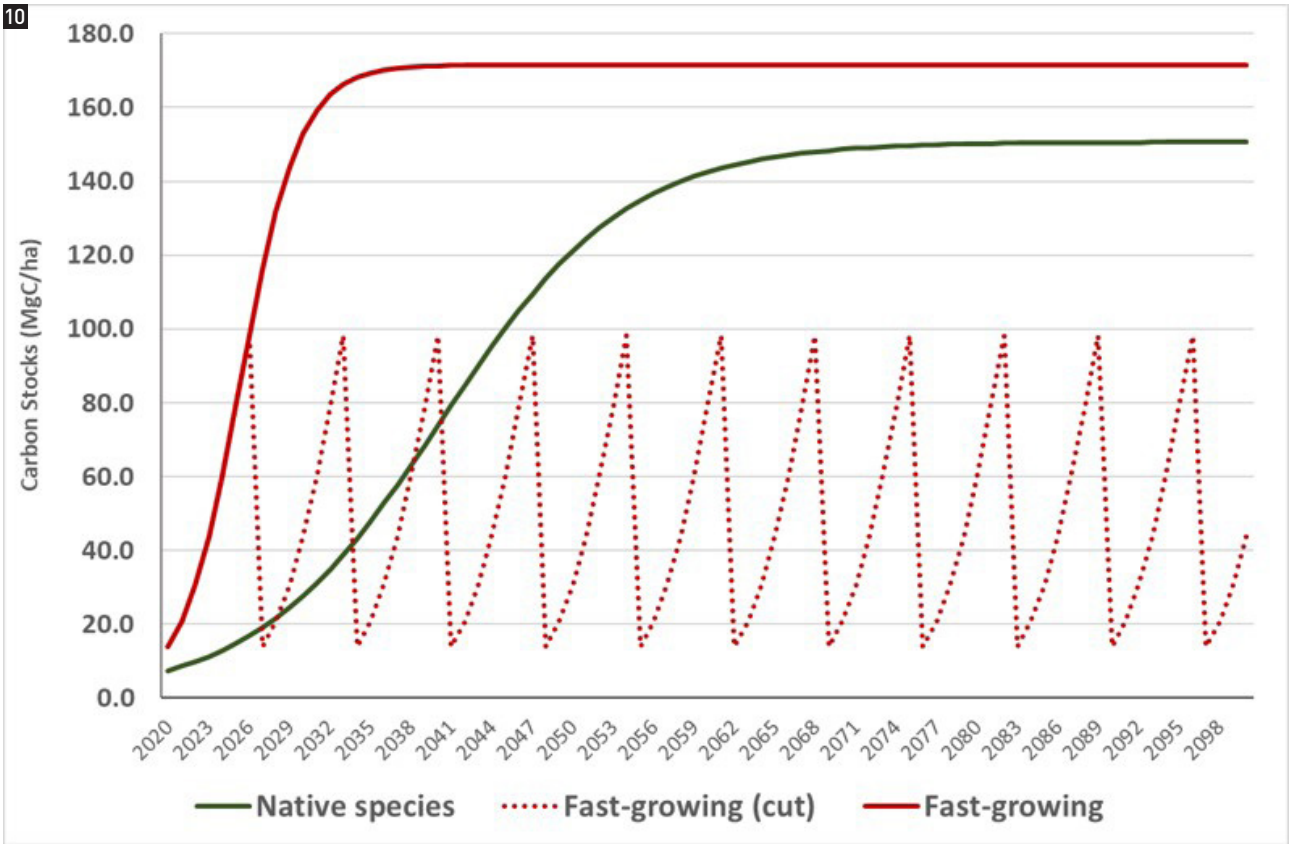


Figure 10: Growth and Yield of the Restored Forests by Species Group (2021-2100)

The estimated production of pulpwood would be 1.5 billion tons in 2027 and 4.8 billion tons in 2060, while the production of sawn wood is projected at 0.7 billion m^3 in 2050 and 1.3 billion m^3 in 2060. As a result, projected revenues are $246 billion (2027-2060) at $45 per ton from pulpwood and $1.4 trillion (2050-2060) at $500 per m^3 from sawn wood.

The total costs of restoration and management of 930 million ha for $4,000 per ha would be about $93.4 billion annually between 2021 and 2060. While this appears very large, it can be put in perspective by comparing it with the global economic loss due to COVID-19 in 2020: The restoration cost would be just about 0.6% of the pandemic-caused losses. In addition, the United Nations World Economic Situation and Prospects (WESP) mid-2020 report said that the global economy is expected to lose nearly $8.5 trillion in output over the next two years due to the COVID-19 pandemic.

In conclusion, the restoration of 930 million ha of degraded forests will bring multiple benefits for carbon stocks, pulpwood, sawn wood, biodiversity enrichment, soil and moisture conservation, ecotourism benefits, and much more in terms of mitigation and adaptation to climate change and a range of other ecosystem services. And the costs are not that high compared to what the world has already faced during the COVID-19 pandemic. We may have to think of conserving our existing forests and using restored forests for wood production. However, species selection, land allocation, and the maintenance of restored lands will pose many challenges to governments around the world.

2.6 LECTURE

Identification of the Potential Degraded Forests for Restoration in the Tropics: Implications for Carbon Sequestration and Revenues

Speaker

Dr. Manjunatha Venkatappa, School of Environment,
Resources and Development, Asian Institute of Technology, Thailand

Moderator

Dr. Promode Kant, Director, Institute of Green Economy, Gurgaon, India

Rapporteurs

- Mr. Khamkhoune Phimsavanh, Deputy Director of Production Forest Management Division, Department of Forestry of Lao PDR
- Mr. Say Sinly, Vice Chief of Forest Plantation in Partnership Office, Department of Private Forest and Forest Plantation in Partnership, Forestry Administration of Cambodia

There is a near-universal agreement that effective restoration of degraded forests is essential for the ongoing global climate and biodiversity crisis and to restore degraded forests. However, it is unclear where these degraded forests are located and how to identify them at scale and with the speed needed for such a mammoth operation. The methods should also be cost-effective and reasonably accurate for wide adoption.

Transparent monitoring, reporting, and verification methods are needed, but existing methods rely on remote sensing methods that require high technical skills. Therefore, various methods have been developed using remote sensing and spatial data. Still, challenges include accessing high-resolution imagery, low spatial extent, relatively low temporal resolution, and lack of global coverage, acquisition conditions, and computing time. However, with big data and cloud computing platforms, tracking and monitoring forest land restoration areas and planted trees has become possible on large scales and at high speeds. In addition, digital technologies equipped with machine learning and deep learning for tracking and monitoring are useful for transparency and quick policy interventions.

The research team developed this concept by identifying degraded lands for restoration purposes in Siem Reap Province of Cambodia. The data used was 2199 Landsat imageries acquired free of cost using the Google Earth Engine (GEE) platform. Enhanced Vegetation Index (EVI) and harmonic regression methods were used to identify phenological behavior for 12 land cover categories as per IPCC Guidelines. The land cover categories identified were evergreen forest, semievergreen forest, deciduous forest, mixed wood and shrub, flooded forest, mangrove forest, bamboo, rubber plantation, croplands, built-up areas, sand, and water.

Phenological behavior was analyzed during the dry season (November-April) for leaf-shedding phenology and during the rainy season (May-October) for leaf-flushing phenology. A total of 722 mean EVIs were generated, and the respective thresholds were determined for 12 land cover categories. Reference data was collected from 300 sampling points in forest permanent sample plots, through field observations, and at drone-based locations. Based on these thresholds, the phenology-based threshold classification method was developed, and potential degraded forests for restoration were identified as shown in Figure 11 below.

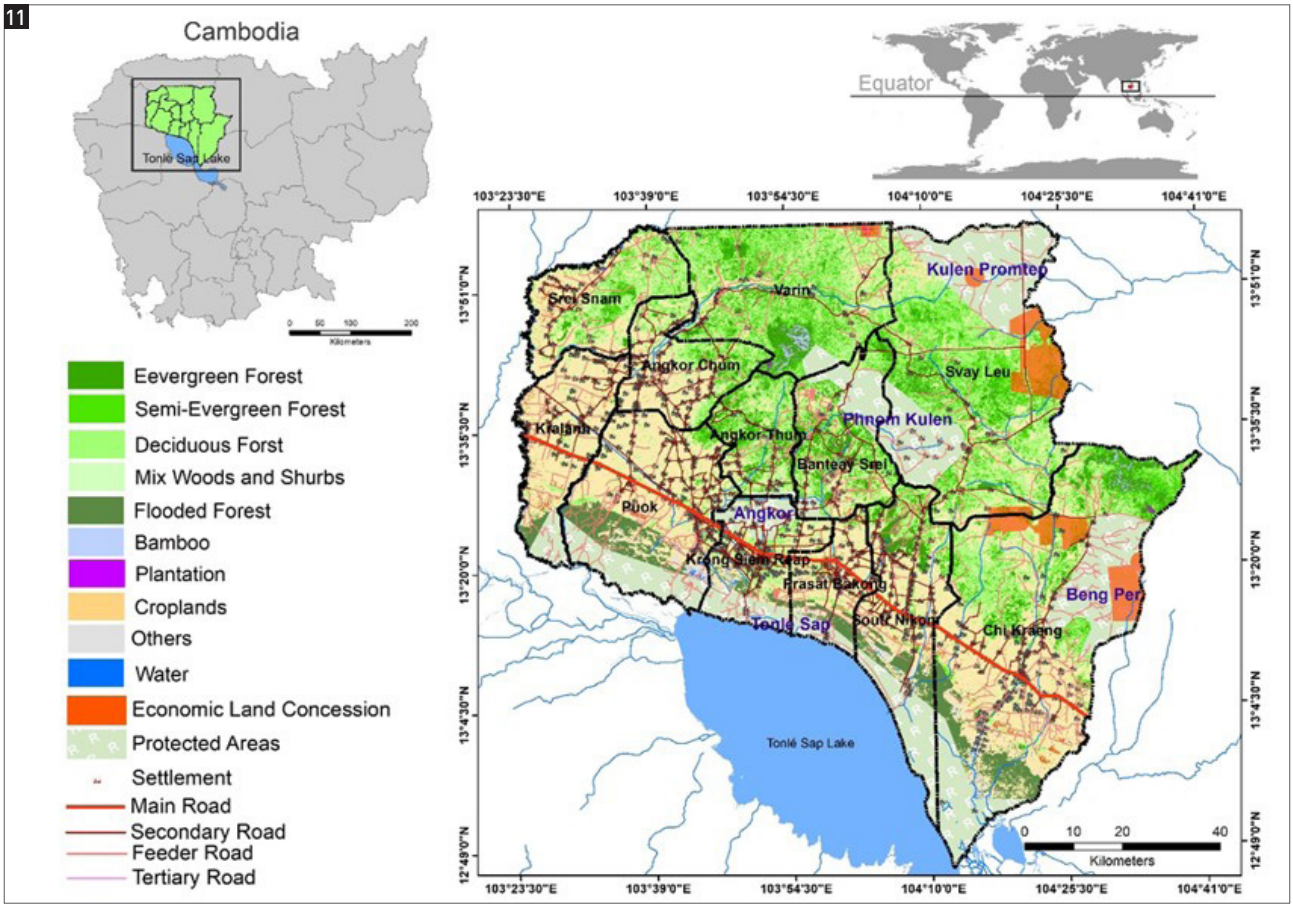


Figure 11: Land Cover Category Identification in Siem Reap Province, Cambodia

Google Earth Engine (GEE) is an open-source platform capable of assessing land cover changes at scale, and yet it requires minimal skills and no cost. Depending on degradation levels, one could decide on the restoration strategies and estimate the costs for forest restoration, as well as related carbon sequestration and revenues. This approach makes it possible to identify degraded forests in the tropics at scale. With increasing data availability, such as population distribution, road networks, Earth data, and cloud-computing technologies, this could become a useful tool to assist large-scale forest restoration planning based on automation. It may also be used to facilitate the monitoring, reporting, and verifying activities required under the REDD+ scheme of the UNFCCC. However, it is necessary to customize the forest categories as they will differ from one location to another.

03

REASONS FOR INADEQUATE FLR IMPLEMENTATION IN ASIA-PACIFIC

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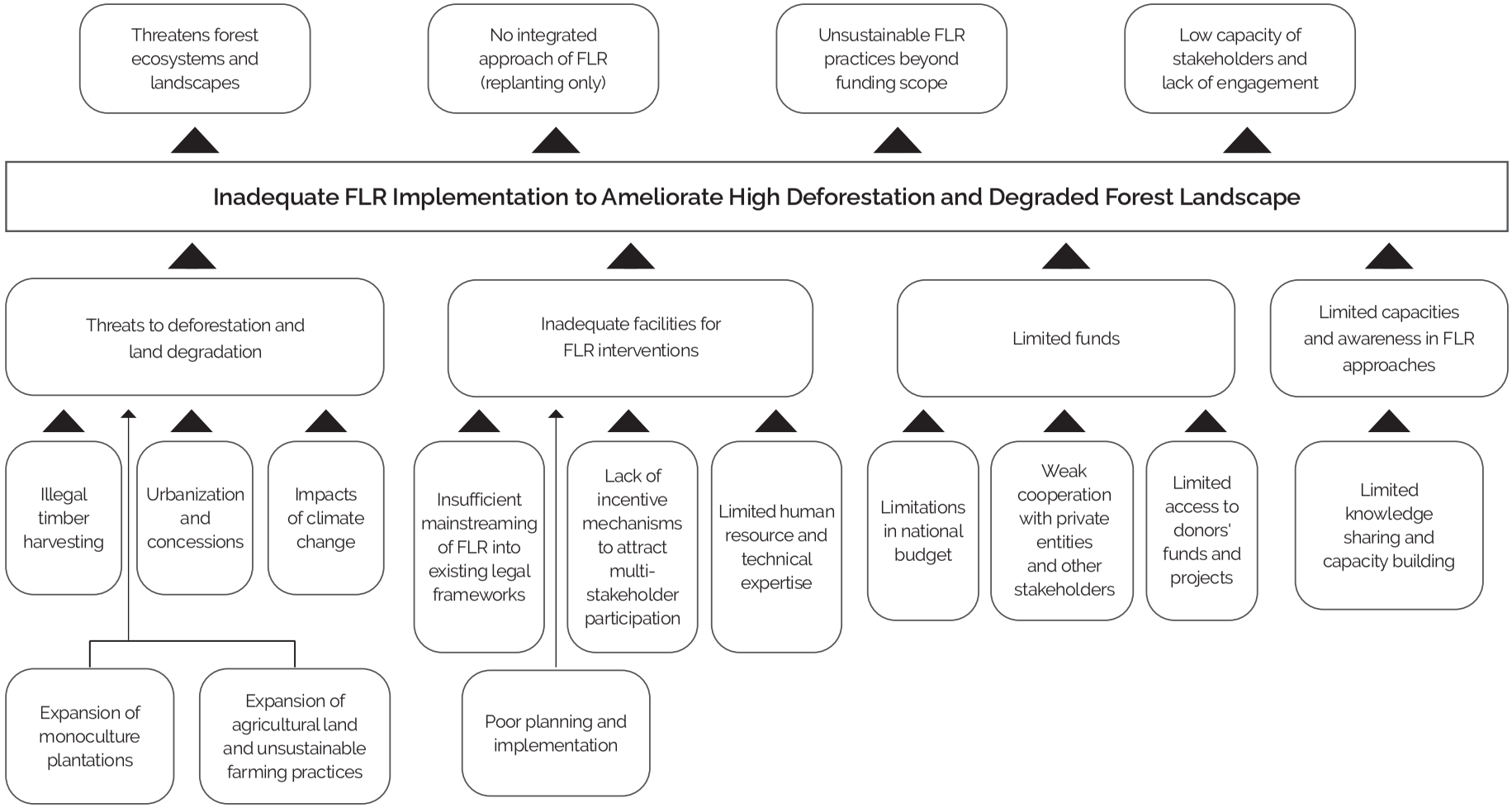
A total of 15 participating countries were invited to present their country status on FLR and draw a problem tree at the country level. This was followed by discussions, modifications as they considered necessary,and then another presentation of a problem tree at the regional level, which has been tabulated below.



(Source: Interventions from 15 participating countries a of the AFoCO-ITTO Capacity Building Workshop on FLR in Asia-Pacific Region, 30 August - 3 September, 2021: Bhutan, Cambodia, Fiji, India, Indonesia, Kazakhstan, Lao PDR, Malaysia, Myanmar, Philippines, Tajikistan, Thailand, Timor-Leste, Turkmenistan, and Viet Nam)

04

TENTATIVE CONCLUSIONS & POSSIBLE POLICY PRESCRIPTIONS

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This AFoCO-ITTO Capacity Building Workshop on "Forest Landscape Restoration in the Asia-Pacific Region: Developing capacities needed for successful Forest Landscape Restoration interventions in the Tropics" provided an excellent opportunity to share national and local restoration cases and lessons, as well as the challenges and opportunities FLR can present for local people and other stakeholders along the way. During the course of this five-day workshop, a number of important issues and tentative conclusions emerged out of the deliberations that followed each of the ten talks delivered by well-known experts in the field and presentations by 15 countries in the region. The following are some of the more important issues, tentative conclusions and possible policy prescriptions that have emerged out of these deliberations:

01

Forests have both biophysical and biochemical effects on the climate of the Earth. The first occurs because forests change the amount of solar radiation reflected back toward the atmosphere relative to bare surface without vegetation. The reflection of solar irradiation, or the albedo effect, of broadleaved forests ranges from 15 to 25%, while that of coniferous forests ranges from 5 to 15%. This is far lower than the reflection of 40 to 90% of solar radiation by snow. Reflection of solar light by white sand is also higher relative to forests. The biochemical effects of forests on climate forcing, on the other hand, involve the process of sequestration of carbon dioxide in forest vegetation, its long-term storage away from the atmosphere and emission of CO_2 by decay and death of vegetation.

In deciding the suitability of raising forests for the purpose of climate change mitigation it is necessary to consider the balance between these two aspects of climate forcing by forests. Land that is covered by snow for most part of the year is not the best choice for encouraging forests for this purpose. Planting forests on vast open stretches of white sand should similarly be avoided. Similar assessments can be made for all lands identified for restoration where the primary objective is mitigation of climate change.

02

The last ice age ended about 10,000 years back when human settlement and settled agriculture was in very early stages and anthropogenic causes of forest degradation were few. At that time, forest vegetation covered as much as 8 billion ha of the Earth's land surface, which is roughly twice that at present. The spread of forests 10,000 years back roughly describes the outermost boundaries within which forests can be encouraged today.

03

Forests are vulnerable to the changing climate. Cases of increased tree mortality due to droughts have been observed on all continents. Seventy percent of tree species are operating close to their limits of water stress tolerance during at least part of the year. To reduce this impact, moisture conservation measures should be adopted in all forests that exhibit vulnerability to drought stress.

04

Late successional trees in a forest mostly belong to the species with longest generation time and slowest spatial distribution. Genetic adaptation in these trees, and migration to more suitable climes, is unlikely to keep track with even moderate climate change scenarios. Forest management in such situations should consider adopting the tools of assisted migration such as encouraging seeding and planting of these species on the northernmost (southernmost in the southern hemisphere) peripheries of their ecosystems, and on their highest altitudinal parts in mountainous terrains, supported by sound and lasting moisture conservation measures.

05

Forest landscape restoration is much larger than the forest plantation activities that usually constitute most of forestry in many countries. It focuses on restoring landscapes taking into account the full range of interacting land uses, tenure, and governance arrangements. It requires engaging stakeholders of all hues, strengths and vulnerabilities, across gender and social status, in deciding restoration goals and strategies, implementation methods, benefit sharing, as well as monitoring, assessment and review, harmonizing diverse perspectives and interests. It aims at restoring multiple socio-economic and environmental functions in a landscape generating a range of ecosystem goods and services that would equitably benefit all stakeholders. It does not permit the loss or conversion of natural forests, natural grasslands or other natural habitats. And, more importantly, it aims at adapting to the changing climate by creating forests for the future.

It thus requires a very different skill set than that of forestry staff in many countries and may even require changes in recruitment policies, such as altering the educational qualifications for entry into forest departments. Governments of the region should examine their forestry staff recruitment and training policies with the help of experts well-versed in FLR and introduce such changes as necessary.

06

During the workshop it was felt that in many countries in the region there is very little interaction between FLR practitioners and the NDAs (or focal points) of their countries under the UNFCCC, UNCCD, CBD, and the UN-REDD, etc., thereby limiting FLR practitioners' understanding about the financing sources and procedures that keep changing over time. For example, the GCF and many other funding organizations, only consider financing proposals that are in line with the country's NDCs under the Paris Agreement. This could be a major reason why large numbers of project proposals are not being approved by financing agencies in most countries in the region. This situation needs to be addressed immediately by institutionalizing regular and frequent interactions among FLR practitioners and national focal points as a matter of government policy.

07

To increase the chances of success in obtaining approval for FLR project finance proposals, it is important to approach the right kind of financing sources and also opt for co-financing that reduces the risk perceptions of funding agencies. The governments of countries in the region may approach the most appropriate sources of finance for FLR under different circumstances as suggested below:

i. Countries with high financial capability: public and private domestic finance
ii. Countries with limited financial capability: bilateral and multilateral finance
iii. Activities that store carbon and increase resilience: GCF, Adaptation Fund
iv. Activities that are part of government mandate: public domestic finance
v. Activities that are transformative: bilateral, multilateral organizations like GCF
vi. Activities that generate income: private finance
vii. Activities that need short-term financing: public international finance
viii. Activities that need long-term financing: PES, carbon markets, private finance

08

In order to enable developing countries to make good quality proposals, the GCF makes available a grant of $1 million to each country every year under the funding window of "Project Preparation Facility" and even permits drawing from this fund in advance for three years, that is, a maximum grant of $3 million in one go. But very few countries of the region have taken advantage of this funding window. The FLR implementing agencies of countries in the region, acting through their governments, may take steps to utilize opportunities to prepare high-quality FLR project proposals that will increase the chances of approval.

09

Methodologies like the Restoration Opportunities Assessment Methodology (ROAM) are now available to help identify priority landscapes for restoration and estimate the costs and benefits of different restoration strategies and opportunities. The national and sub-national governments in the region may use these methodologies to identify and prioritize degraded landscapes for advance planning of restoration over the coming decade and chart out appropriate restoration strategies. If needed, they can also access Project Preparation Facility window of the GCF for this purpose.

10

It is now possible to identify the extent and depth of degradation over vast areas in forests in the tropics using Google Earth Engine, an open-source platform capable of assessing land cover changes at scale requiring minimum skills and no money for sourcing data. It may also be used to facilitate monitoring, reporting, and verification of REDD+ activities. For this purpose, widespread one-day training, repeated annually, could be implemented for all levels of forest staff and other FLR implementing agencies. This will greatly enhance the quality and timeliness of restoration planning, as well as monitoring, reporting and verification.

Asian Forest Cooperation Organization (AFoCO)

AFoCO is a treaty-based intergovernmental organization that is committed to strengthening forest cooperation and taking concrete actions to promote sustainable forest management and address the impacts of climate change.

AFoCO Regional Education and Training Center (RETC)

AFoCO RETC was established as a subsidiary organ of AFoCO to develop the capacities of member countries in dealing with forestry and related environmental issues. The RETC provides practical and problem-solving oriented training programs, training courses, and workshops to enhance the knowledge and skills of diverse participants including government officials from member countries, researchers, university students, and members of local communities, among others.

www.afocosec.org

International Tropical Timber Organization (ITTO)

ITTO is an intergovernmental organization promoting the sustainable management and conservation of tropical forests and the expansion and diversification of international trade in tropical timber from sustainably managed and legally harvested forests.

www.itto.int

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