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FOREST LANDSCAPE RESTORATION (FLR):
ANALYSIS OF ONGOING FLR PROGRAMS OF CPF MEMBERS AND REVISION OF ITTO RESTORATION GUIDELINES

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Executive Summary

FOREST LANDSCAPE RESTORATION (FLR):

ANALYSIS OF ONGOING FLR PROGRAMS OF CPF MEMBERS AND REVISION OF ITTO RESTORATION GUIDELINES -September 2018

The ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests, which were developed in close collaboration with IUCN, WWF, CIFOR and FAO were approved by the Council during its Thirty-Second Session in May 2002 [Decision 3(XXXII)]. They were, at the time, new and innovative, as they were the first attempt to develop guidelines addressing both policy makers and forest managers in tropical forestry focusing on the management and restoration of degraded natural forests and addressing the management of secondary forests. As decided by the Council at the time of approving the Guidelines, they focused on restoring permanent forest estates, and deliberately left out the wider issues of trees in landscapes, including agroforestry concepts. In 2005, ITTO complemented the 2002 Guidelines with a technical guide on forest landscape restoration (ITTO/IUCN 2005) which also focused attention on wider landscape approaches.

Since then, there has been increased interest by the international forestry community on the development of forest landscape restoration (FLR). Today, FLR has become one of the major international themes in global forestry, besides REDD+ and FLEG. New international initiatives appeared such as the 2011 Bonn Challenge and the 2014 New York Declaration on Forests, the creation of the Global Landscape Forum and the Global Partnership on Forest and Landscape restoration, to name a few. FLR is embedded as a goal in the SDGs and in the Global Goals of the United Nations Strategic Plan for Forests. It is also embedded in the approaches of REDD+ to address forest degradation and enhancement of sinks.

Besides such increased interest in the political arena, there have also been advances on the technical front, and new guidelines, tools and diagnostic instruments have been developed over the past years. Great attention has also been given over the past few years on the financing of restoring forest landscapes.

The present report, addressed to the ITTC, summarizes the definitions, principles and approaches used in forest landscape restoration. It gives an overview of the major ongoing forest landscape programs and initiatives with focus on the tropics. The report also summarizes existing guidelines that have been developed to shape forest landscape initiatives at national and local levels and gives an overview of the tools and approaches developed to analyze FLR, including planning, implementation, monitoring and evaluation. A short chapter is dedicated to financing FLR.

In its final section, the report refers briefly to the implementation of the 2002 ITTO Restoration Guidelines and sets them into the context of today's perspective. An analysis is done on what we can learn from the existing initiatives, guidelines and tools for the revision of the 2002 ITTO Guidelines. Finally, the main issues are identified and briefly described that need to be considered when preparing the new ITTO Guidelines in 2019 that have the ambition to be used in the wider framework of the CPF.

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List of abbreviations

Abbreviation	Name
CBD	Convention on Biological Diversity
CIFOR	Center for International Forest Research
CPF	Collaborative Partnership on Forests
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FIP	Forest Investment Programme
FLEG	Forest Law Enforcement and Governance
FLR	Forest Landscape Restoration; Forest AND Landscape Restoration
FLRM	Forest and Landscape Restoration Mechanism (of the FAO)
FS	Food security
GCF	Green Climate Fund
GEF	Global Environment Facility
GLR	Global Restoration Initiative
GFFFN	Global Forest Financing Facilitation Network
GPFLR	Global Partnership on Forest Landscape Restoration
GM	Global Mechanism (UNCCD)
LDN	Land Degradation Neutrality
ISFL	BioCarbon Fund Initiative for sustainable forest landscapes
ITTC	International Tropical Timber Council
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
MRAE	Monitoring, reporting, assessment and evaluation
NDC	Nationally Determined Contribution (to the objectives of the Paris Agreement)
PES	Payments for environmental services
REDD+	Reducing deforestation and forest degradation, SMF and enhancement of sinks
ROAM	Restauration Opportunities Assessment Methodology
SDGs	Sustainable Development Goals
SFM	Sustainable forest management
SMF	Sustainably managing forests under silvicultural management and conservation
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNSPF	UN Strategic Plan for Forests
WRI	World Resources Institute

1. Introduction

1.1 Background

Forest landscapes are an essential part of development and climate change action, contributing to the livelihoods of people worldwide as well as the health of our planet. But forests are under threat globally since humans have evolved from hunter and gatherer 10,000 years ago to the exclusive user the lands and natural resources over the entire globe. Since a couple of decennials, particularly in the tropics, the demand to use land for subsistence, commercial agriculture and economic development drives deforestation, forest and land degradation to an extent that today anthropogenic landscapes predominate natural landscapes. Urbanization, transportation, energy infrastructure, mining, wood fuel and others heavily affect forest cover and the elastic capacity of ecosystems, particularly natural forests.

"Forest Landscape Restoration", respectively "Forest and Landscape restoration" (FLR, same acronym but differently approached by the various initiatives) is the long-term process of *regaining* ecological functionality and enhancing human well-being across deforested and degraded landscapes. FLR is implemented using a "landscape approach", combining natural resource management, restoration opportunities and livelihood considerations across jurisdictional boundaries with an aim to restore a mosaic of land uses, including forests and woodlands, pastures, croplands, wetlands and more" (afr100 2017, 2).

Today, more than 100 countries have recognized the need for stronger forest protection and have included actions related to land-use change and forests in their Nationally Determined Contributions (NDCs) that address the countries strategy to reach the objectives of the Paris Climate Accord. Forests are the main natural carbon sink on land (against the oceans as the other main carbon sink). Forests if protected and managed well, also can increase the resilience of rural landscapes overall, thus supporting sustainable livelihoods. Enhanced efforts to preserve forests and restore degraded lands can help address an expected global gap in emission reductions needed to keep the global temperature increase under 2 degrees C, as defined as a political compromise in the Paris Climate Accord.

In 2002, ITTO was one of the first international organizations that developed a working approach on "forest restoration", by *inter alia* publishing and promoting pantropical guidelines for the restoration of tropical natural forests and forest landscapes, the "ITTO guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests" (ITTO 2002). These guidelines were prepared to highlight the increasing importance of the existing and potential roles of degraded and secondary forests in tropical landscapes[1]. The 2002 Guidelines were meant to fill a gap between two existing ITTO policy guidelines developed before: the Guidelines for the Sustainable Management of Natural Tropical Forests (1991, updated in 2015) and the ITTO Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests (ITTO 1993).

The 2002 ITTO Restoration Guidelines were created sixteen years ago. Since then, the global restoration movement has gained vast momentum and several initiatives, guidelines, publications, frameworks and technical and financial toolkits have been and are being developed to enable forest (and) landscape restoration. This report provides an opportunity to update ITTO member countries on the development on the forest restoration front since ITTC approved the 2002 ITTO Guidelines. The report also serves as a background paper to review and revise the existing guidelines in strong coordination with the interested members of the Collaborative Partnership on Forests (CPF) and strengthen ITTO's comparative advantage within the wider Global Partnership on Forest and Landscape Restoration (GPFLR).

[1] Note that the main consultants who developed the 2002 ITTO Restoration Guidelines were the authors of the present background report.

1.2 Objective of the report

The objective of the present report is to prepare a generic overview on existing FLR approaches and prepare an overview of ongoing FLR programs of CPF members with identification of opportunities for synergies and collaboration to support the achievement of internationally agreed restoration targets. The report aims to

(i) Give an overview of existing programs, initiatives, guidelines, principles, tools and relevant reports on Forest Landscape Restoration (FLR) to facilitate the revision process and to avoid duplications in the following guidelines development process.

(ii) Serve as a basis to define a common framework of principles and practices for successful FLR planning, implementation, monitoring and evaluation in the tropics.

1.3 Structure of the report

This report focuses on three main topics and is structured as follows:

1. Description of existing FLR definitions, policies, guidelines and financing in chapter 2, 5 and 6 and in an extended annex comprising metadata on relevant FLR guidelines, projects, initiatives, manuals prepared and annexed.
2. Analysis of the current situation and resulting learnings for the elaboration of new ITTO/CPF guidelines in chapter 7.
3. Identification of issues to develop new CFP/ITTO FLR guidelines.

The geographical focus of this report in respect to FLR is on tropical humid and semi-humid biomes, including lowlands and highlands.

1.4 FLR Expert Meeting in Bangkok, 14-16 November 2018

The present report intends to inform the ITTC on the recent development of FLR globally. It is expected that the Council will give input to and advise the deliberations of the Expert Group meetings for Forest Landscape Restoration in the Tropics that will take place on 13-15 November 2018 in Bangkok, Thailand. The Expert Group Meeting is organized as part of the GEF project “Fostering Partnerships to Build Coherence and Support for Forest Landscape Restoration” which is a Joint Initiative of the Collective Partnership on Forests (CPF). The GEF project is implemented by IUCN, and executed by several CPF partners, including ITTO. ITTO is currently taking the lead for the “Analysis of FLR programs of CPF members with identification of opportunities for synergies and collaboration in supporting the achievement of internationally agreed restoration targets”. For this purpose, a concept note for the development of voluntary FLR guidelines with CPF members has been prepared by the ITTO Secretariat.

The Expert Group Meeting in Bangkok aims to:

- Review the lessons of selected Forest Landscape Restoration (FLR) projects in Africa, Asia-Pacific and Latin America;
- Update global FLR movement, FLR programs of the members of the Collective Partnership on Forests (CPF) to identify opportunities for capturing synergies;
- Review the use of existing FLR tools/guidelines developed by CPF members including the following:
  - ITTO (2002). ITTO guidelines for the restoration, management, and rehabilitation of degraded and secondary tropical forests. ITTO in collaboration with CIFOR, FAO, IUCN and WWF. ITTO Policy Development Series no 13.
  - GPFLR (WRI 2018a). Principles for FLR.
  - CIFOR (Chazdon and Guariguata 2018). Decision support tools for forest and landscape restoration: current status and future outlook. Occasional Paper 183.
  - IUCN (2014a). Restoration Opportunity Assessment Methodology (ROAM).
  - FAO (Berrahmouni et al. 2015) . Global guidelines for the restoration of degraded forests and landscapes in dry lands.

  - IUFRO (Stanturf et al. 2017). Implementing Forest Landscape Restoration.
- Identify the gaps of the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests in supporting the effective design and implementation of FLR initiatives in the tropic; and
- Under the framework of operationalizing GPFLR's Principles for FLR, design the scope and key elements of new FLR guidelines to promote the restoration and management of degraded tropical forests and decide on the next steps to develop new guidelines.

The outcomes of the Expert Group Meeting will be shared at the Global Landscapes Forum Bonn and a side event of UNFCCC COP 24 in Poland in December 2018. It is expected that the Bangkok Expert Group Meeting will further enhance FLR partnerships and provide technical guidance for the design of new FLR guidelines for degraded tropical forests (CGP/ITTO Restoration Guidelines revised).

The ITTO/CPF guidelines will then be developed by the consultants in a first draft and widely consulted within the ITTO community and CPF members. It is expected that a new set of Guidelines are available for approval at the 55th session of the ITTC in fall 2019.

2. Forest Landscape in the Tropics

2.1 Major definitions surrounding forest landscape restoration

"Landscape approaches" have gained prominence in the search for solutions to reconcile conservation and development tradeoffs (Sayer 2009) in a defined geographic area. Today, the term encompasses a wide variety of interpretations. According to Sayer et al. (2013),"landscape approaches seek to provide tools and concepts for allocating and managing land to achieve social, economic, and environmental objectives in areas where agriculture, mining, and other productive land uses compete with environmental and biodiversity goals". Strangely, in the definition of Sayer et al. (2013), developed by an impressive number of scientists, the term "forest" was not mentioned at all.

The Global Landscape Forum defines Landscape Approach as "about balancing competing land use demands in a way that is best for human well-being and the environment. It means creating solutions that consider food and livelihoods, finance, rights, restoration and progress towards climate and development goals".

In its 2002 restoration guidelines, ITTO defines "landscape" as "a cluster of interacting ecosystem types".

FAO (2012b) defines landscape approach as to deal with large-scale processes in an integrated and multidisciplinary manner, combining natural resource management with environmental and livelihood considerations. It differs from ecosystem approaches in that it may include multiple ecosystems. The landscape approach also factors in human activities and their institutions, viewing them as integral parts of the system rather than as external agents. This approach recognizes that the root causes of problems may not be site-specific and that a development agenda requires multi-stakeholder interventions to negotiate and implement actions.

The term **"forest landscape"** appeared for the first time in a common workshop between the World Bank and IUCN in Segovia, Spain in1998. The term was not defined, but it was described as follows: "a geographic area or watershed, which is characterized by an important share of naturally regenerated forest or planted forest, and trees on agricultural land", which can or cannot include a habitat/plant community component.

Over the past few years, scientific literature, policy processes, initiatives and action programs that deal with forest landscapes have tried to define the term more precisely, including, *inter alia*:

- A landscape that is, or once was, dominated by forests and woodlands and which continues to yield forest-related goods and services (Maginnis and Jackson 2002).
- A forest landscape is any area that once grew or could benefit from growing trees and shrubs. Such landscapes include agricultural areas where on-farm trees could improve productivity, biodiversity and livelihoods (Ordonez et al. 2014).
- A forest landscape is a mosaic of interconnected, interdependent stands or patches that are repeated in a pattern across the larger landscape. This pattern has both spatial and temporal components (Unknown 2012).
- The GPFLR (2018b) refers to forest landscapes as "forests and trees within a broad range of land uses".

The term "Forest Landscape Restoration, FLR" is not unanimously defined neither, though precise definitions have already been formulated 16 years ago.

- Maginnis and Jackson (2002) , in conclusion of a forest expert meeting in Segovia, Spain in 2001, defined FLR as "a process that aims to regain ecological integrity and enhance human well-being in deforested or degraded forest landscapes". It is generally understood that FLR is not an end, but a means of regaining, improving, and maintaining vital ecological and social functions, in the long-term leading to more sustainable land uses. Ultimately, FLR is the process of restoring "the goods,

services and ecological processes that forests can provide at the broader landscape level as opposed to solely promoting increased tree cover at a particular location"

- Rietbergen-McCracken et al. (2007) defined FLR as "a planned process that aims to regain ecological integrity and enhance human well-being in deforested or degraded landscapes".
- Laestadius et al. (2011) defined FLR as an "integrating framework that can, and should, be applied across a range of land uses to ensure that key ecosystem functions and societal requirements are maintained and strengthened". It "restores functionality and productivity to degraded lands and forests".
- In its promotional material, GPFLR (Besseau et al. 2018) defined FLR, meaning "forest and landscape restoration as "an active process that brings people together to identify, negotiate and implement practices that restore an agreed optimal balance of the ecological, social and economic benefits of forests and trees within a broader pattern of land uses." Thus, FLR aims at reversing the degradation of soils, agricultural areas, forests, and watersheds thereby regaining their ecological functionality.
- FAO/RECOFTC (2016) sees FLR as "an innovative approach that integrates restoration work in the forest with other activities across the landscape for achieving optimum productivity, both in commercial and ecological terms".
- According to Lamb et al. (in Stanturf et al. 2012) "FLR differs from site-level restoration because it seeks to restore ecological processes that operate at a larger landscape scale such as those maintaining the populations of species requiring large habitat areas or those responsible for hydrological flows."
- Stanturf et al. (2017) defined FLR as "a planned process that aims to regain ecological integrity and enhance human wellbeing in deforested or degraded landscapes"
- According to the Society for Ecological Restoration (SER 2004), restoration is the "process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed".

ITTO, in its 2002 Restoration Guidelines, based on a policy decision by the Council, did not introduce or defined the term "Forest Landscape Restoration". It simply referred to "**Forest restoration**" defined as "a management strategy applied in degraded [primary] forest areas. Forest restoration aims to restore the forest to its sate before degradation (same function, structure and species composition". In this sense ITTO defined forest restoration as the as a management strategy to address forest degradation, defined as "a reduction in the capacity of a forest to provide goods and environmental services; *capacity* includes the maintenance of the elasticity of ecosystem structures and functions" (ITTO 2002, 2015).

For the purpose of this report, we understand under FLR an ongoing process of regaining ***ecological functionality and enhancing human well-being*** across deforested or degraded forest landscapes. In this context, FLR is more than just planting trees – it is restoring a whole landscape to meet present and future needs and to offer multiple benefits and land uses over time. It is about:

- **Forests** because it involves increasing the number and/or health of trees in an area;
- **Landscapes** because it involves biophysical aspects, such as whole watersheds, policy dimensions, such as jurisdictions, and certainly sociological and cultural conditions, as landscapes have been shaped by anthropogenic activities; and
- **Restoration** because it involves bringing back the biological productivity of an area to achieve any number of benefits for people and the planet;
- It is **long-term** because it requires a multi-year vision of the ecological functions and benefits to human well-being that restoration will produce although tangible deliverables such as jobs, income and carbon sequestration begin to flow from the early stage;

- While FLR sometimes involves the opportunity to restore large contiguous tracts of degraded or fragmented forest land, most of restoration opportunities are found on or adjacent to agricultural or pastoral land. In these situations, restoration must complement and not displace existing land uses; this results in a **patchwork or mosaic of different land uses** including: agriculture, agroforestry systems and improved fallow systems, ecological corridors, areas of forests and woodlands, and river or lakeside plantings to protect waterways;
- Successful FLR is "*forward-looking* and *dynamic"*, focusing on strengthening **the resilience of landscapes** and creating future options to adjust and further optimize ecosystem goods and services as societal needs change or new challenges arise.

Today, the FLR concept is still being refined and redefined to accommodate new perspectives and ideas on what it entails and what sets it apart from other more already well-known approaches (that are attributed to the specific terminology of FLR) to restore degraded forests and putting trees back into the landscape. Indeed, the process of compiling knowledge on restoring forest landscapes, which involves today the global forest and environmental community, has itself brought increased clarity to the concept. It needs to be underlined that while the overall conceptual framework of FLR is relatively new, virtually all the principles and techniques behind the approach have been used since many decades and are familiar to many forestry and land-use practitioners. In essence, FLR is an approach to managing the dynamic and often complex interactions between people, natural resources and land-uses that comprise a landscape. It makes use of collaborative approaches to harmonize the many land-use decisions of stakeholders with the aim of restoring ecological integrity and enhancing the development of local communities and national economies. However, it is obvious that collaborative approaches are not an easy to apply, as they need a good level of regional-local governance, a funded initiative/project or good leadership. Also, the approaches and tools needed to reach participatory, negotiated agreements at the landscape level need time. In many ways, it is an alternative to top-down, expert-driven land-use planning, providing a means to reflect societal choice through applying the principles of an ecosystem-management approach (ITTO/IUCN 2005).

2.2 Major themes in respect to forest landscapes in the tropics

Considering the overall aim to regaining ***ecological functionality and enhancing human well-being*** across deforested or degraded forest (and) landscapes, FLR entails one or a combination of the following options:

1. Restoring degraded (production) forests
   This forest management option is typically implemented in areas where environmental and socio-economic pressures have led to the degradation of the initial forest cover (in terms of extent, structure, composition and functions). This type of restoration can include implementing conservation and silvicultural measures to ensure that previously forested land has the time to regenerate naturally; the planting of trees through enrichment concepts; and protecting land from uses that led to deforestation and degradation. Restoration of forests is usually aimed at increasing local production of wood and non-wood forest products, carbon storage, conserving and improving local biodiversity through the restoration of natural habitat, increasing watershed protection and enhancing.

2. Rehabilitating degraded forest land to improve protective functions
   The rehabilitation of degraded, protective lands and buffers involves establishing and enhancing trees and forests (the latter often distributed in small patches over the landscape). The main aim is to improve watershed protection and erosion control alongside the generation of products and/or services to support livelihoods and income.

3. Integrating trees in agricultural landscapes outside forests
   Such type of land management interventions can include increasing the number of trees across the landscape; preventing land degradation through improved conservation agricultural practices, such

as agroforestry; adoption of resource management practices that limit overgrazing, bush fires, logging or harvesting of trees for fuelwood; and protecting naturally occurring shrubs and trees on farms to boost crop yields. Objectives for integrating trees in agricultural landscapes include sustainable enhancement of field productivity, improved community livelihood and incomes and better adaptation to climate change effects. Agroforestry is widely acknowledged as a climate-smart agricultural practice that can increase the productivity, sustainability and resilience of agricultural or pastoral landscapes. As such, it represents a valuable means for restoring overexploited and low productivity agricultural lands.

4. Boosting agricultural productivity on degraded lands
   Such type of agricultural management option addresses the use of unsustainable agricultural and grazing practices as one of the main causes of land degradation overall, in the tropics, but also in temperate and boreal biomes. Degraded agricultural lands can be restored either by sustainably intensifying the production of annual crops, tree crops, tree orchards and other perennials; or by using deforested and degraded land that need specific rehabilitation measures to become productive.

Five main themes to spark action on restoring tropical (humid) forest landscapes:

1. Implementing forest (landscape) restoration as an approach to SFM
   How does forest landscape restoration occur from needs assessment to successful execution? How to approach forest landscape planning and implementation (degraded forests, secondary forests, forest land rehabilitation)? What are the methods, measures and silvicultural and product & services value chain and marketing approaches to apply and under which circumstances (recommended actions)?
2. Food security and livelihoods
   How does tackling environmental degradation boost food security and livelihoods? How agricultural products and ecosystem services can provide functional landscapes? How do agroforestry, climate-smart agriculture and traditional land-use practices influence forest conservation and management?
3. Rights
   Taking a rights-based approach, in which community and individual rights to land, trees, and enhanced forest cover are recognized or protected, is important for the long-term success of FLR initiatives (McLain et al. 2017). Recognizing community and individual rights is key to successfully restore forest landscapes. Issues relate to land tenure and legal reform, barriers to securing land and resource rights, challenges raised by restoration.
4. Financing sustainable landscapes
   To restore landscapes sustainable value chains there is need for innovative financial solutions for stakeholders and other users, coordinated public-private investments, engaging the private sector using restoration-sensitive value chains and connecting local producers to national and international markets. What can we learn from past experiences? How can REDD+ be instrumental for FLR? GCF and other instruments?
5. Measuring progress toward SDGs and climate goals
   Tropical forest countries need the latest knowledge and tools to enhance their capacities and share the benefits across borders. There is need to explore innovative technologies that gauge how public and private sectors perform at the landscape level, the indicators for restoration targets, and the role of MRV and data management in restoration.

2.3 Principles of Forest Landscape Restoration (FLR)

Amongst the multiple processes of formulating guiding FLR principles, the eight FLR Principles developed by the WRI (2018a) need to be highlighted (Box 1). These proposed FLR principles are in most parts congruent

with the definition of the The Bonn Challenge (2018b) and can thus be seen as the most relevant and widespread approach presently.

Box 1: WRI (2018a) FLR Principles

1. **Focus on landscapes**

It restores entire landscapes, not individual sites. Restoration typically entails balancing across the landscape a mosaic of interdependent land uses—such as protected forest areas, ecological corridors, regenerating forests, other natural ecosystems, agroforestry systems, agriculture, improved fallow systems, well-managed plantations, and riparian strips—to meet a variety of human needs.

2. **Restore ecological functionality**

It restores the ecological functionality of the landscape, such as its richness as a habitat, its ability to contain erosion and floods, and its resilience to climate change and various disturbances. This can be done in many ways, one of which is to restore the landscape toward the pre-human disturbance or "original" vegetation, but other strategies may also be used.

3. **Allow for multiple benefits**

It generates a suite of ecosystem goods and services by intelligently and appropriately increasing tree cover across the landscape. In some places, trees are added to agricultural lands without forming a forest canopy in order to enhance food production, reduce erosion, provide shade, and produce firewood. In other places, trees are added to create a closed canopy forest capable of sequestering large amounts of carbon, protecting downstream water supplies, and providing rich wildlife habitat.

4. **Recognize that a suite of interventions is possible**

It embraces a wide range of strategies for restoring trees on the landscape. For instance, some strategies make way for "nature to take its course" (e.g., curtailing livestock grazing to allow trees to spontaneously regrow), while others involve very active human intervention (e.g., tree planting).

5. **Involve stakeholders**

It actively engages local stakeholders — including landowners, land managers, communities, civil society, governments, and the private sector—in decisions regarding restoration goals, implementation methods, and trade-offs. It is important that the restoration process respects local stakeholders' rights, aligns with their land management needs, and provides them with benefits. Active, voluntary involvement of local stakeholders can lead to better buy-in, greater access to local knowledge, motivated land managers, and less need for external resources.

6. **Tailor to local conditions**

It adapts to fit local social, economic, and ecological contexts; there is no "one size fits all."

7. Manage adaptively

It adjusts restoration strategies over time as environmental conditions, human knowledge, and societal values change. It leverages continuous monitoring and learning to make adjustments as the restoration process progresses.

8. **Avoid conversion of natural ecosystems**

It does not call for increasing tree cover beyond what would be ecologically appropriate for a particular location and should not cause any loss or conversion of natural forests, grasslands, or other ecosystems (e.g., into tree or crop plantations). Restoration should complement, not undermine, ecosystem conservation efforts.

In the context of the ongoing processes to improve and foster FLR policies and actions, CPF members are currently working on a set of globally agreed (common) principles that should guide actions to implement

forest landscape restoration. Box 2 summarizes an initial set of global principles that are presently discussed in the framework of the global forest and restoration initiative. They heavily lean on the proposed principles by WRI presented in Box 1.

Box 2: Proposal for globally agreed FLR Principles (April 2018, September 2018)

1. Focus on landscapes

FLR takes place within and across entire landscapes, not individual sites, representing mosaics of interacting land uses and management practices under various tenure and governance systems. It is at this scale that ecological, social and economic priorities can be balanced.

2. Engage stakeholders and support participatory governance

FLR actively engages stakeholders at different scales, including particularly vulnerable groups, in planning and decision-making regarding land-use, restoration goals and strategies, implementation methods, benefit sharing, monitoring and review processes.

3. Restore multiple functions for multiple benefits

FLR Interventions aim to restore multiple ecological, social and economic functions across a landscape and generate a range of ecosystem goods and services that benefit multiple stakeholder groups. Examples of such benefits are improved soil fertility, reduced erosion, provision of shade, carbon storage, increased downstream water supply and quality, improved quality of habitats for wildlife and species diversity, production of timber, bioenergy, non-timber forest products, creation of jobs and diversification of livelihoods, recreational areas, cultural and spiritual sites, and increased resilience to climate change and other disturbances.

4. Conserve and enhance natural ecosystems within landscapes

FLR stops further deforestation and degradation of natural forests and other ecosystems, and enhances the recovery, conservation, and sustainable management of forests and other natural ecosystems. It improves the quality and resilience of forests and other natural ecosystems, particularly with regard to species and genetic diversity.

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

FLR uses a variety of restoration approaches that are adapted to the local social, cultural, economic and ecological values, needs, and landscape history. These approaches include managing existing and newly established vegetation (increasing tree cover, changing species composition, altering canopy structure) and restoring natural disturbances, implemented in appropriate landscapes. It integrates technical approaches with existing or new governance structures, local capacities, incentive systems, market mechanisms and funding.

6. Manage adaptively for long-term resilience

FLR seeks to improve the resilience of the landscape and its stakeholders over the medium and long-term. Restoration approaches should be adjusted over time to reflect changes in environmental conditions, knowledge, capacities, stakeholder needs, and societal values. As restoration progresses, information from monitoring activities, research, and stakeholder guidance should be integrated into management plans. FLR considers adaptations to changing climate and risk of extreme events.

3. Programs and Initiatives in the framework of FLR

The ITTO's 2002 Guidelines were the first global attempt to address forest restoration at a broad, pantropical level (ITTO 2002). In 2005, these guidelines were complemented by a field guide that expanded the scope of the guidelines outside natural forests (ITTO/IUCN 2005). Since then, increased attention to forest and landscape restoration was gradually given in international forest regime and FLR has become today one of

the major topics in global forestry, besides REDD+ and eventually FLEG. New international initiatives appeared such as the 2011 Bonn Challenge, the New York Declaration on Forests in 2014 and the attention on the restoration agenda in the SDGs, amongst others.

Today it has become increasingly difficult to make a comprehensive overview of the many programs and initiatives, guidelines and tools dealing with FLR. This chapter is an attempt to give a structured overview on the various programs and initiatives, as follows:

- Hosted or led by UN organizations in general terms (but with wider partners)
- Hosted or led by the Convention on Biological Diversity (CBD)
- Initially promoted by the International Union for Conservation of Nature (IUCN)
- Led by the Center for International Forestry Research (CIFOR)
- Led by the World Resource Institute (WRI)
- Others, in particular related to REDD+.

3.1 Hosted or led by UN organizations

The UN Sustainable Development Goals (SDGs)

The United Nations' Sustainable Development Goals (SDGs) were first introduced in 2012 at the United Nations Conference on Sustainable Development in Rio de Janeiro. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. They replace the Millennium Development Goals (MDGs), which started a global effort in 2000 to tackle the indignity of poverty (UNDP 2018). The 17 goals with its 169 targets were adopted by the UN member states in 2015. They are part of the Agenda 2030 and are to be achieved by all member states by 2030 (EDA 2018).

SDG 15 "Life on Land" does focalize on sustainable forest management, combating desertification, halting and reversing land degradation and halting biodiversity loss (UN 2018). Its target 15.3 is closely related to *FLR: 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world (ibid.).*

United Nations Strategic Plan for Forests (UNSPF)

In January 2017, 197 Member States of the United Nations Forum on Forests (UNFF) reached agreement on the first *UN Strategic Plan for Forests* (UNSPF) that provides an ambitious vision for global forests in 2030. This plan intends to significantly improve the outlook for the world's forests, including a target that would expand the world's forests by 120 million hectares *by 2030. The First Global Goal of the UNSPF is* to reverse the loss of forest cover worldwide through SFM, including protection, restoration, afforestation and reforestation, and increase *efforts to prevent forest degradation* and contribute to the global effort of addressing climate change. An associated target 1.3 has also been formulated, as follows: "By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation*, restore degraded forests* and substantially increase afforestation and reforestation globally". The UNSPF however is a strategic policy document and does include an implementation mechanism. An associated programme, the Global Forest Financing Facilitation Network (GFFFN) supports countries to access funding to reach the UNSPF goals, including in FLR.

Land Degradation Neutrality (LDN) of the UNCCD

The Land Degradation Neutrality is a global commitment taken in 2015 for the period up to 2030 for restoring the productivity of vast expanses of degraded land and reduce the impacts of drought on vulnerable populations. The program is managed by the Secretariat and the Global Mechanism of the United Nations Convention to Combat Desertification (UNCCD). It supports interested countries in the national land degradation neutrality target (LDN) setting process, including the definition of national baselines, targets and

associated measures to achieve LDN by 2030 through the *LDN Target Setting Programme* (TSP). (UNCCD 2018b). In September 2018, 119 countries had subscribed to a target setting (UNCCD 2018a)[2].

The global TSP programme is implemented in cooperation with numerous partners, including the Global Environment Facility (GEF), the International Union for Conservation of Nature (IUCN), Food and Agriculture Organization of the United Nations (FAO), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), the European Space Agency, the International Soil Reference and Information Centre, the Joint Research Centre of the European Commission, World Resources Institute (WRI), Soil Leadership Academy (SLA), and the Government of the Republic of Turkey (though the Ankara Initiative), Germany, France, Luxembourg, Spain, Trinidad and Tobago, and the Republic of Korea through the Changwon Initiative (UNCCD 2018b).

New York Declaration on Forests led by the UNDP

Led by the United Nations Development Programme (UNDP), in a continuous effort to keep the global momentum for forest and landscape restoration, the broader *New York Declaration on Forests* (NYDF) was launched during the 2014 United Nations Climate Summit (NYDF 2018a). It strives to halve deforestation by 2020 and to end it by 2030. The NYDF was endorsed by more than 190 entities including 52 governments, more than 50 of the world's biggest companies, and more than 50 influential civil society and indigenous peoples' organizations (BMU 2018). The NYDF links it activities to the Bonn Challenge targets, the Sustainable Development Goal No. 15, the Aichi Targets, Article 5 of the Paris Agreement on Climate Change, REDD+ (NYDF 2018a). It refers to those initiatives as a resource for countries, associations, enterprises and others who manage land and wish to meet national goals on restoration of degraded and deforested lands while contributing to achieving these international commitments and being recognized for doing so (ibid.). The NYDF (2018b) formulates the ten following NYFD goals

1. Stop Forest Loss: At least halve the rate of loss of natural forests globally by 2020 and strive to end natural forest loss by 2030.
2. Agricultural Deforestation: Support and help meet the private-sector goal of eliminating deforestation from the production of agricultural commodities such as palm oil, soy, paper and beef products by no later than 2020.
3. Non-agricultural Deforestation: Significantly reduce deforestation derived from other economic sectors by 2020.
4. Alternative Livelihoods: Support alternatives to deforestation driven by basic needs (such as subsistence farming and reliance on fuel wood for energy) in ways that alleviate poverty and promote sustainable and equitable development.
5. Restoration: Restore 150 million hectares of degraded landscapes and forestlands by 2020 and significantly increase the rate of global restoration thereafter, which would restore at least an additional 200 million hectares by 2030.
6. Forests and SDGs: Include ambitious, quantitative forest conservation and restoration targets for 2030 in the post-2015 global development framework, as part of new international sustainable development goals.
7. Reduce Emissions: Agree in 2015 to reduce emissions from deforestation and forest degradation as part of a post-2020 global climate agreement, in accordance with internationally agreed rules and consistent with the goal of not exceeding 2°C warming.
8. Forest Finance: Provide support for the development and implementation of strategies to reduce forest emissions.
9. Reward Results: Reward countries and jurisdictions that, by taking action, reduce forest emissions-particularly through public policies to scale-up payments for verified emission reductions and private-sector sourcing of commodities.

[2] See live ticker: https://www.unccd.int/actions/ldn-target-setting-programme

10. Governance & Communities: Strengthen forest governance, transparency and the rule of law, while also empowering communities and recognizing the rights of indigenous peoples, especially those pertaining to their lands and resources.

The NYDF collaborates closely with the NYDF Assessment Partners, a network of civil society groups and research institutions that annually evaluate the progress toward meeting the NYDF goals (BMU 2018; Forest Declaration 2018)

Forest and Landscape Restoration Mechanism (FLRM) of the FAO

"FAO (2018a) established the FLRM in 2014 with the aim of helping countries meet their pledges to restore degraded lands made under the Bonn Challenge and related regional processes such as the AFR100 and the Initiative 20x20 in Latin America, as well as the global initiatives related to landscape restoration such as the Land Degradation Neutrality (LDN) targets under the UNCCD and the CBD Aichi targets. Altogether, 350 million hectares of degraded land world-wide are targeted to be restored by 2030."

The FLRM works at global, regional and country level. At country level, the Mechanism aims at (i) facilitating a multi-stakeholder process in selected countries,(ii) developing, compiling and disseminating tools and best practices related to FLR, (iii) supporting the establishment of pilot projects to demonstrate viable technologies and approaches and (iv) supporting quality control of well-established FLR efforts to ensure compliance with accepted guidelines and standards (McGuire 2014).

On a global level the FLRM will "will support the development of guidelines and standards for the establishment of baseline situations and the monitoring, measurement, reporting and verification of successful restoration efforts" in cooperation with the GPFLR (McGuire 2014). "A crucial function will be to ensure that FLR becomes a more integral part of budget allocations of key international financial institutions through closer partnership and collaboration." (ibid.).

3.2 Hosted or led by the Convention on Biological Diversity (CBD)

Aichi Biodiversity Targets of the CBD

The Aichi Biodiversity Targets are part of CBD's Strategic Plan for Biodiversity 2011-2020 and are a set of 20 targets towards biodiversity diversity conservation. Three of the Aichi Targets relate directly to restoration efforts.

- Aichi Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced (CBD 2018a).
- Aichi Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods, and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable (CBD 2018a).
- Aichi Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 percent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification (CBD 2018a).

Restoration goals of the CBD

In 2016, at its XIII COP in Cancun, Mexico, the Convention on Biological Diversity adopted the short-term action plan on ecosystem restoration as a flexible framework and adaptable to national circumstances and legislation for immediate action (CBD 2016b).

The overall objective of this action plan is to promote restoration of degraded natural and seminatural ecosystems, including in urban environments, as a contribution to reversing the loss of biodiversity,

recovering connectivity, improving ecosystem resilience, enhancing the provision of ecosystem services, mitigating and adapting to the effects of climate change, combating desertification and land degradation, and improving human well-being while reducing environmental risks and scarcities (CBD 2016b).

The purpose of the action plan is to help parties, as well as any relevant organizations and initiatives, to accelerate and upscale activities on ecosystem restoration. It aims to support timely achievement of the Strategic Plan for Biodiversity 2011-2020, in particular Aichi Biodiversity Targets 14and 15 (CBD 2016b).

Forest Ecosystem Restoration Initiative (FERI) led by CBD

The Forest Ecosystem Restoration Initiative is developed by the Korea Forest Service of the Republic of Korea and implemented by the Secretariat of the Convention on Biological Diversity (CBD). It supports developing countries as they develop and operationalize national targets and plans for ecosystem conservation and restoration within the framework of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets, especially Targets 5, 14 and 15 (CBD 2018b).

Through a series of regional capacity building workshops, national assessments and direct support to restoration activities, FERI provides countries with best practices and foster an exchange of experiences including challenges and opportunities to contribute towards the planning and implementation of forest ecosystem conservation and restoration (CBD 2018b).

3.3 Launched by the International Union for Conservation of Nature (IUCN)

The Bonn Challenge

The Bonn Challenge was launched in September 2011 at a ministerial event hosted by the Government of Germany and IUCN. It was designed at the time to link the decisions on forests made under the United Nations Framework Convention on Climate Change with those of the Convention on Biological Diversity, which had adopted the goal of restoring 15% of destroyed or degraded ecosystems by 2020 (Laestadius et al 2011). It is now a broad initiative supported by the Global Partnership on Forest Landscape Restoration (GPFLR) with more than 30 members. The Bonn Challenge is a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030. The initiative was later endorsed and extended by the New York Declaration on Forests at the 2014 UN Climate Summit. The Bonn Challenge, as interpreted today, is not a global commitment *per se*, but a practical means of realizing existing international commitments, including the CBD Aichi Target 15, the UNFCCC REDD+ goal, and the Rio+20 land degradation neutrality goal. It is an implementation vehicle for national priorities such as water and food security and rural development while contributing to the achievement of international climate change, biodiversity and land degradation commitments (The Bonn Challenge 2018c).

Underlying the Bonn Challenge is the forest landscape restoration (FLR) approach (see beneath), which aims to restore ecological integrity at the same time as improving human well-being through multifunctional landscapes.

The Guidelines and Principles of the Bonn Challenge can be found in Chapter 4.2.

Global Partnership on Forest Landscape Restoration initially let by the IUCN

The Global Partnership on Forest and Landscape Restoration (GPFLR) was launched in 2003 by IUCN, WWF and the UK Forestry Commission. Today, the GPFLR is a proactive network with a global focus that unites 30 governments, international organizations (including ITTO), NGOs, private companies and individuals with a common goal: restoring the world's degraded and deforested lands. The partnership was initiated with the purpose of catalyzing and reinforcing a network of diverse examples of restoration of forests and degraded lands that deliver benefits to local communities and to nature and fulfil international commitments on forests. A key concept paper on the GPFLR has been recently published (Besseau et al. 2018).

As a spin-off of the GPFLR, the ***Global Restoration Council*** **(GRC)** aims to harness the collective wisdom, influence and energy of its members to catalyze and sustain a global movement for restoration. The council is a voluntary, non-departmental entity supported by the World Resources Institute on behalf of, and as a contribution to, the GPFLR and in support of other organizations that are actively engaged in restoration activities (WRI 2018b).

3.4 Led by the Center for International Forestry Research (CIFOR)

The Global Landscape Forum

Led by the Center for International Forestry Research (CIFOR) alongside founding partners UN Environment and the World Bank, the Global Landscapes Forum (GLF) accelerates action towards the creation of more resilient, equitable, profitable, productive and healthy landscapes and the achievement of the UNFCCC Paris Agreement and the Sustainable Development Goals of the Agenda 2030 (GLF 2018c). As a forum, it engages year-round through global, regional and local events (for a), national dialogues and online digital summits.

The GLF claims to be the world's largest science-led platform on sustainable land use. GLF is partner of the ***AFR100 Initiative***, the ***20x20 Initiative*** and the ***Global Peatlands Initiative*** (GLF 2018c), see also beneath. It is mainly financed by the German Government.

A GLF Forum for Africa was held in end of August 2018 in Nairobi on Prospects and Opportunities for Restoration in Africa. The event aimed to achieve the following (GLF 2018b):

- Leverage and deepen existing networks, particularly at the regional level.
- Demonstrate that food security and environmental degradation are not mutually exclusive by balancing the long and short terms concern.
- Integrate the rights and resources of communities, vulnerable groups and smallholders into the vision of sustainable longer-term prosperity.
- Scrutinize closely the ways in which technological innovations can deliver development goals and measure their success.

The next event of the **Global Landscape Forum** is scheduled on December 1-2, 2018 in Bonn, Germany. It is expected that more than 2000 people will participate. The main topic proposed is "to explore how to move from commitments and pledges on sustainable landscapes to implementation. From investors to indigenous groups, from policy makers to farmers and youth, all key stakeholders should learn from each other, share success stories and work together to put into action practices and policies.

3.5 Led by the World Resource Institute (WRI)

Global Restoration Initiative led by WRI

Led by the WRI "the Global Restoration Initiative works with governments and international partners to inspire, enable and implement restoration on degraded landscapes, returning them to economic and environmental productivity. Alongside IUCN and other partners, WRI has identified more than two billion hectares of cleared and degraded forest and agricultural lands suitable for restoration – an area roughly twice the size of China" (WRI 2018c). WRI is partnering with governments, businesses, and communities around the world to restore 500 million hectares of deforested and degraded land, an area half the size of China (WRI 2018d).

WRI's work programme in FLR consists of a large variety of approaches, which are conducted in close collaboration with partners of the Global Partnership on Forest Landscape Restoration (GPFLR), and include:

- ***The Initiative 20x20***, a country-led effort to bring 20 million hectares of land in Latin America and the Caribbean into restoration by 2020. The initiative—launched formally in 2014 at COP 20 in Lima—will support the Bonn Challenge (WRI 2018c)
- ***The African Forest Landscape Restoration Initiative - AFR100*** is a country-led effort to bring 100 million hectares of land in Africa into restoration by 2030. The initiative—launched formally in 2015 at COP 21 in Paris— will support the Bonn Challenge, the New York Declaration on Forests and the African Resilient Landscapes Initiative (ARLI), an initiative to promote integrated landscape management with the goal of adapting to and mitigating climate change (WRI 2018c). The initiative launched by New Partnership for Africa's Development (NEPAD), the WRI, the German's Federal Ministry for Economic Cooperation and the World Bank connects political partners with technical and financial support to scale up restoration on the ground and capture associated benefits for food security, climate change resilience, and poverty alleviation (afr100 2018a, 2018b).
- ***The Restoration Diagnostic*** is a structured method for identifying which key success factors for restoration are already in place, which are partially in place, and which are missing within a country or landscape that has restoration opportunities (WRI 2018c).
- ***The Atlas of Forest and Landscape Restoration Opportunities*** is a tool to help stakeholders and decision makers identify opportunities for restoration across the globe (WRI 2018c),
- ***Re-Greening*** is a process in which farmers protect and manage trees that naturally regenerate on their land, rather than cut them down. Regenerated trees and shrubs help restore degraded lands and provide many benefits – from increased crop yields, recharging groundwater, providing fodder and firewood, and storing carbon (WRI 2018c).
- A specific support activity is coordinated by WRI, jointly with IUCN and the Global Restoration Council to support the Governors' Climate and Forests Task Force (GCF Task Force) in gaining momentum on FRL. The GCF task force is a unique subnational collaboration between 29 states and provinces from Brazil, Indonesia, Ivory Coast, Mexico, Nigeria, Peru, Spain, and the United States. Though traditionally focused on advancing jurisdictional programs designed to promote low emissions rural development and reduced emissions from deforestation and land use (REDD+), the governors have expanded their purview into forest and landscape restoration.

3.6 Others (in the framework of REDD+)

REDD+ is a mechanism to reward developing countries for reducing emissions from deforestation and forest degradation, conservation of forests, sustainably managing forests and enhancement of sinks. It aims to create an incentive for developing countries to protect, better manage and sustainably use their forest resources, and in so doing contribute to conserving biodiversity and to face climate change. The approach has been developed through years-long deliberations in the United Nations Framework Convention on Climate Change (UNFCCC). The role of forests has been specified in Paris Agreement 2015 of the UNFCCC, with an Article (5) reading *"… policy approaches and positive incentives* [to be applied] *for activities relating to reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" (UN 2015).*

Today, more than 65 countries have engaged in readiness processes to develop REDD+ as a measure to mitigate greenhouse gases at national level. They have formulated their so-called Nationally Determined Contribution (NDC) to the Paris Agreement and they included REDD+ targets in their NDC. In September 2018, 58 countries have gone through a so-called REDD+ readiness and a considerable number of countries are preparing results-based payment programs for implementing their national REDD+ strategy. Such programs include addressing forest degradation through appropriate forest and landscape approaches.

A major driver for developing REDD+ as a workable process are several international initiatives that help to foster methods and approaches for the development of REDD+ in developing countries. Among them, the most important are the following:

- **The Forest Carbon Partnership Facility (FCPF)**, a multi-donor program active since 2008, hosted by the World Bank with two major program elements: (i) Readiness for REDD+, that include the preparation of national REDD+ strategies; and (ii) the Carbon Fund, which is designed to reward countries for emission reduction through pilot implementation of the REDD+ strategy (results-based payment). In 2018, 47 countries participate in the Readiness Program pf FCPF and 19 countries have applied or are preparing a Carbon Fund results-based REDD+ implementation program (FCPF 2018).
- **UNREDD**, jointly implemented by FAO, UNEP and UNDP and operational since 2008, supports nationally led REDD+ processes and promotes the informed and meaningful involvement of all stakeholders, including indigenous peoples and other forest-dependent communities, in national and international REDD+ implementation. The focus is mainly on readiness and capacity building, including forest and landscape approaches
- The **Forest Investment Program (FIP)**, operational since 2010 and part of the *Climate Funds* of the World Bank, supports investments to build institutional capacity, forest governance and information; investments in forest mitigation efforts, including forest ecosystem services; and investments outside the forest sector necessary to reduce the pressure on forests such as alternative livelihood and poverty reduction opportunities. In 2018, FIP has an active program in 20 countries. Forest and landscape restoration is part of the investment approach in some of the key countries supported by the FIP.
- The **BioCarbon Fund Initiative for Sustainable Forest Landscapes (ISFL)**, operational since November 2013, is a multi-donor initiative coordinated by the World Bank. The ISFL collaborates with selected forest countries to reduce emissions from the land sector through smarter land use planning, policies, and practices. The ISFL is pioneering work that enables countries and private sector actors to adopt changes in the way farmers work on the ground to the way policies are made at the international level. This work supports sustainable landscapes, climate-smart land use, and green supply chains.

Besides these multi-donor/multi-partner initiatives, there are several initiatives in REDD+ on bilateral level that include forest and landscape restoration (e.g. supported by Norway, Germany, UK)

Also, since the first operationalization of the **Green Climate Fund (GCF)**, a considerable number of tropical forest countries that had embarked in REDD+ strategy development is addressing REDD+ strategy implementation projects to GCF. As a measure to reduce deforestation and forest degradation and to address joint mitigation/adaptation projects, forest and landscape restoration measures feature prominently in such forestry project proposals submitted to the GCF.

Finally, Table 1 beneath lists those initiatives that have defined clear output targets for forest and landscape restoration. These initiatives are ongoing, and countries and organizations are continuously committing to targets.

Table 1 : FLR initiatives with defined area targets (summary August 2018)

Restoration Initiative	Defined area target (million ha)	Year of declaration	Target year
Bonn Challenge	150	2011	2020
New York Decl. Forest	350	2015	2030
FLRM (FAO with partners)	350	2014	2030

Land Degradation Neutrality (LDN)	2000	2015	2030
Global Restoration Initiative (GRI)	500	2015	2030
AFR100 – the African FLR Initiative	100	2015	2030
20x20 Initiative Latin America/Car.	20	2014	2020

Table 2 gives an overview on committed forest restoration targets made by ITTO producer member countries. Out of the 35 producer member countries, 21 countries have formulated area forest landscape targets thus far and in a number of countries, projects are ongoing to develop concepts and piloting actions in the field.

Table 2 : ITTO producer member countries' restoration commitments in the Bonn Challenge, update September 2018 (afr100 2018c; Initiative 20x20 2018; The Bonn Challenge 2018a).

ITTO member country	**Bonn Challenge commitment 2020 / 2030**	**Description (for details, please refer to the specific reports of the countries)**	**Date of commitment**
Bénin	0.5 m ha	AFR100; Project support from IUCN and FAO	2016
Brazil	2.9 m ha 0.3 m ha 0.1 m ha	20x20, State of Mato Grosso 20x20, State of Sao Paulo 20x20 State of Espirto Santo	2016
Cambodia	-	-	-
Cameroon	12 m ha	AFR100; political FLR agenda, restoration, SFM	2017
Central African Republic	3.5 m ha	AFR100; inventory of degraded lands, support from IUCN, FAO, UNEP	2016
Colombia	1 m ha	20x20, Ministry of Agriculture	2014
Congo	2 m ha	AFR100; tree and tree-crop plantations, SFM, certification	2016
Costa Rica	1 m ha	PES for regeneration/reforestation, assessment ongoing	2012
Côte d'Ivoire	5 m ha	AFR100; enrichment planting in parks, wetlands, cocoa agroforests	2016
DR Congo	8 m ha	AFR100; ROAM assessment, landscape change dynamics analysis	2016
Ecuador	0.5 m ha	20x20; mosaic restoration; Ministry of Environment	2014
Fiji	-	-	-
Gabon	-	-	-
Ghana	2 m ha	AFR100; restoration in northern Savannah ecological zone	2015
Guatemala	1.2 m ha	20x20; wildlife-friendly crops, mosaic and wide-scale restoration, assessment ongoing	2014
Guyana	-	-	-
Honduras	1.0 m ha	Ministry of Environment, pledged 2014 UN Climate Summit	2015
India	21 m ha		2015
Indonesia	-	-	-
Liberia	1 m ha	AFR100; SNRM, land use information sharing, support WRI	2015
Madagascar	4 m ha		2015
Malaysia	-	-	-
Mali	-	-	-
Mexico	8.5 m ha	20x20; Ministry of Agriculture and Ministry of Environment	2014
Mozambique	1 m ha	AFR100; mapping degraded forest lands, community forestry, restoration, nurseries	2015
Myanmar	-	-	-
Panama	1 m ha		2016
PNG	-	-	-
Peru	3.2 m ha	20x20; through the Ministry of Agriculture	
Philippines	-	-	-
Suriname	-	-	-

Thailand	-	-	-
Togo	1.4 m ha	AFR100; FLR ROAM study implemented in 2016	2015
Trinidad/Tobago	-	-	-
Vietnam	-	-	-

4. Overview of Existing FLR Guidelines

4.1 ITTO Guidelines of the International Tropical Timber Organization (ITTO)

The ITTO (2002) *Technical guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests* have been the first guidelines developed for pantropical use. They will be discussed in more detail in chapter 7.1.

4.2 Guidelines of the Bonn Challenge

FLR Approach of the Bonn Challenge

In the framework of the Bonn Challenge*, Forest landscape restoration* "is the ongoing process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes. FLR is more than just planting trees – it is restoring a whole landscape to meet present and future needs and to offer multiple benefits and land uses over time. It is about:

- forests because it involves increasing the number and/or health of trees in an area;
- landscapes because it involves entire watersheds, jurisdictions, or even countries in which many land uses interact[3]; and
- restoration because it involves bringing back the biological productivity of an area to achieve any number of benefits for people and the planet" (The Bonn Challenge 2018b).

It is long-term because it requires a multi-year vision of the ecological functions and benefits to human well-being that restoration will produce although tangible deliverables such as jobs, income and carbon sequestration begin to flow from the early stage (The Bonn Challenge 2018b).

While FLR sometimes involves the opportunity to restore large contiguous tracts of degraded or fragmented forest land, "most of restoration opportunities are found on or adjacent to agricultural or pastoral land". In these situations, restoration must complement and not displace existing land uses. This results in a patchwork or mosaic of different land uses including: agriculture, agroforestry systems and improved fallow systems, ecological corridors, areas of forests and woodlands, and river or lakeside plantings to protect waterways (ibid.).

Successful FLR is forward-looking and dynamic, focusing on strengthening the resilience of landscapes and creating future options to adjust and further optimize ecosystem goods and services as societal needs change or new challenges arise (The Bonn Challenge 2018b)

The FLR approach of the The Bonn Challenge comprises a number of guiding principles, including:

- *Focus on landscapes* – Consider and restore entire landscapes as opposed to individual sites. This typically entails balancing a mosaic of inter-dependent land uses across the landscape, such as protected areas, ecological corridors, regenerating forests, agroforestry systems, agriculture, well-managed plantations and riparian strips to protect waterways.
- *Restore functionality* – Restore the functionality of the landscape, making it better able to provide a rich habitat, prevent erosion and flooding and withstand the impacts of climate change and other disturbances. This can be done in many ways, one of which is to restore the landscape to the original vegetation, but other strategies may also be used.
- *Allow for multiple benefits* – Aim to generate a suite of ecosystem goods and services by intelligently and appropriately increasing tree cover across the landscape. In some places, trees may be added to agricultural lands to enhance food production, reduce erosion, provide shade and produce firewood. In other places, trees may be added to create a closed canopy forest capable of

[3] As stated in chapter 2.1. the authors of the present report define landscape in a wider context, including certainly sociological and cultural conditions, as landscapes have been shaped by anthropogenic activities

sequestering large amounts of carbon, protecting downstream water supplies and providing rich wildlife habitat.

- *Leverage suite of strategies* – Consider a wide range of eligible technical strategies for restoring trees on the landscape, ranging from natural regeneration to tree planting.
- *Involve stakeholders* – Actively engage local stakeholders in decisions regarding restoration goals, implementation methods and trade-offs. It is important that the restoration process respects their rights to land and resources, is aligned with their land management practices and provides them benefits. A well-designed process will benefit from the active voluntary involvement of local stakeholders.
- *Tailor to local conditions* – Adapt restoration strategies to fit local social, economic and ecological contexts; there is no "one size fits all".
- *Avoid further reduction of natural forest cover* – Address ongoing loss and conversion of primary and secondary natural forest.
- *Adaptively manage* – Be prepared to adjust the restoration strategy over time as environmental conditions, human knowledge and societal values change. Leverage continuous monitoring and learning and make adjustments as the restoration process progresses" (The Bonn Challenge 2018b).

4.3 Guidelines of the International Union for Conservation of Nature (IUCN)

Guidelines for Forest Restoration in Ghana

The 2006 IUCN Guidelines for Forest Restoration in Ghana is a booklet stating the following 10 principles and the respective strategies and actions to take for FLR in Ghana (IUCN 2006):

1. The adverse of impacts of fire on forest health and security
2. Logging reduces the biomass and diversity of timber species
3. The maintenance of soil properties and fertility should be maintained after all mining operations
4. Soil fertility and sustainable livelihoods should be promoted
5. Abandoned farms lands should be made productive, and increase the biomass and biodiversity
6. Deforested sites that were meant for plantation sites, but which were not used should be productive and increase biomass
7. Riparian vegetation should be maintained to protect streams and rivers
8. Forest sites for charcoal making and fuelwood which have been over-exploited and hence have reduce biomass and biodiversity should be restored
9. Agreement should be reached on all actions to be taken on FLR
10. There should be regular monitoring to ensure the sustainable supply of goods and services

The booklet gives - in a very nutshell – a good overview on FLR application adapted to the conditions of the country. Howerver, they remain a guideline in a broader sense only and do not advise the practioner onconcrete actions. Also, policy and governance aspects are not considered in this practitioners' guideline.

Restoration of forest land in Africa.

The 2009 IUCN booklet «La restauration des paysages forestières en Afrique» (Restoration on forest land in Africa (only available in French), is a collection of 10 principles, mostly related to policy, governance and stakeholder management related to FLR. It is a set of recommendations that are considered as the basic principles when undertaking FLR. They are designed to be taken into account before starting a FLR project or during the kick-of process rather than a guide for on the ground actions (IUCN 2009).

Principles and Practice of Forest Landscape Restoration - Case studies from the drylands of Latin America

This 2011 IUCN publication is a collection of articles summarizing experiences with FLR on drylands in Latin America. The publication is based on research on (i) dryland forests dynamics, loss and degradation, (ii) the

socio-economic value of dryland forests (iii) analysis of FLR techniques and identification of priority areas, (iv) impact of degradation on genetics and implications on FLR and (v) policy recommendations (Newton and Tejedor 2011).

The publication is rather a review of actual research results than a “principles and practices” document. However, the rather misdirecting heading does not reduce the value of this publication as a source and reference text for experiences that have absolutely to be considered when addressing FLR in dryland forests.

4.4 Guidelines of the African Forest Landscape Restoration Initiative (AFR100)

Voluntary Guidelines for Forest Landscape Restoration under AFR100

These rather short AFR100 *guidelines* are declared to be voluntary and to be a draft by the AFR100 and cover some definitions of FLR principles and a so called *FLR Options Framework*. The principles are the following: (afr100 2017, 4–5):

1. Restoring multiple ecosystems functions
2. Integrated management of landscapes
3. Restoration strategies supporting multiple interventions
4. Participatory decision making
5. Protection of natural ecosystems to enhance resilience
6. Monitoring, learning and adapting
7. Policy coherence around national commitments and land use
8. Nationally owned and driven

The FLR Options Framework suggests various different FLR actions in respect of the land type and the land use, but it is rather short and only includes forest land, agricultural land and protective land and buffers (afr100 2017, 8).

Guiding Principles for Measuring and Monitoring Progress on Forest and Landscape Restoration in Africa

This AFR100-based set of *principles* does mainly treat monitoring activities. The planning of monitoring activities should always follow a three steps approach (afr100 2018d):

- Definition of the scale of the FLR effort and thus the monitoring system
- Selection on indicators based on a framework developed by AFR100 and on specific goals
- Selections of the resources with focuses on using cross-sectoral approaches and already existing monitoring networks when monitoring new FLR projects, even if these systems are currently monitoring other aspects than FLR.

Monitoring should always encompass not only ecological but also (i) socioeconomic, (ii) political, (iii) financial and (iv) biophysical aspects (afr100 2018d).

The afr100 (2018d) does also stress the fact that within every monitoring system, trade-offs have to be accepted for an acceptable cost/efforts ratio and that communication strategies have to be an integrated part of FLR monitoring.

The guidelines do further recommend several tools to facilitate FLR monitoring such as IUCN’s ROAM (infoflor 2018b), INVEST of The Natural Capital Project led by the University of Stanford (Sharp et al. 2018), the Rapid Rural Appraisal of the Institute of Development Studies (IDS 2018) and the FLRM knowledge base of the FAO (FAO 2018b).

4.5 Guidelines of the FAO

Global guidelines for the restoration of degraded forests and landscapes in drylands

The Food and Agriculture Organization of the United Nation (FAO) has released global guidelines for the restoration of degraded forests and landscapes in drylands as FAO Forestry Paper 175 (Berrahmouni et al. 2015). These guidelines constitute a comprehensive reference book with detailed step-by-step instruction for different levels of FLR, from policy making to planting trees, predominantly focusing on drylands[4] and not on forests directly. The first two chapters give an introduction into drylands and its challenges and the needs of restoration (ibid., 1ff). The guidelines than consist of three main chapters (ibid., 19ff):

1. Guidelines for policy makers, covering the following main topics: (i) Addressing the drivers of land degradation, (ii) enabling and investing in assessment, monitoring and capacity building, (iii) facilitating the supply in reproductive material, (iv) improving governance and creating right conditions for investment, (v) fostering knowledge and research
2. Guidelines for practitioners, covering the following main topics: (i) planning and choosing restoration strategies, (ii) protection and managing drylands, (iii) assisted natural regeneration, (iv) planting.
3. FLR monitoring and evaluation, covering the following main topics: (i) integrating in the planning, (ii) starting monitoring, (iii) involving stakeholders, (iv) monitoring, evaluation and knowledge sharing.

The last part of the publication contains an extended collection of case studies (Berrahmouni et al. 2015, 65ff).

4.6 Guidelines of the World Resource Institute (WRI)

Scaling up Regreening: Six Steps to Success

The 2016 “Scaling up Regreening: Six Steps to Success” of the WRI is a guideline laying out and describing six important main steps for successful FLR implementation (Reij and Winterbottom 2016):

1. Identify and Analyze Existing Regreening Successes
2. Build a Grassroots Movement for Regreening
3. Address Policy and Legal Issues and Improve Enabling Conditions for Regreening
4. Develop and Implement a Communication Strategy
5. Develop or Strengthen Agroforestry Value Chains and Capitalize on the Role of the Market in Scaling Up Regreening
6. Expand Research Activities to Fill Gaps in Knowledge About Regreening

The guidance explains the six steps’ background and importance and gives advises on activities needed to successfully fulfill the six steps. It also gives a short introduction on regreening, were it happens and what its impacts are (Reij and Winterbottom 2016).

“Scaling up Regreening” is a mix between a guideline and a tool as it involves guiding principles that are then accompanied by suggestions for implementation on the ground.

Finally, figure 1 is an attempt to give a graphic overview on the FLR initiatives, programmes, guidelines and processes that are currently in place at global level. Organisations are marked in red, major policy initiatives at global level in green and regional level in yellow and guidelines and tools in white.

[4] In its guidelines the FAO defines drylands as “Areas with an aridity index value of less than 0.65 – that is, areas in which annual mean potential evapotranspiration is at least 1.5 times greater than annual mean precipitation

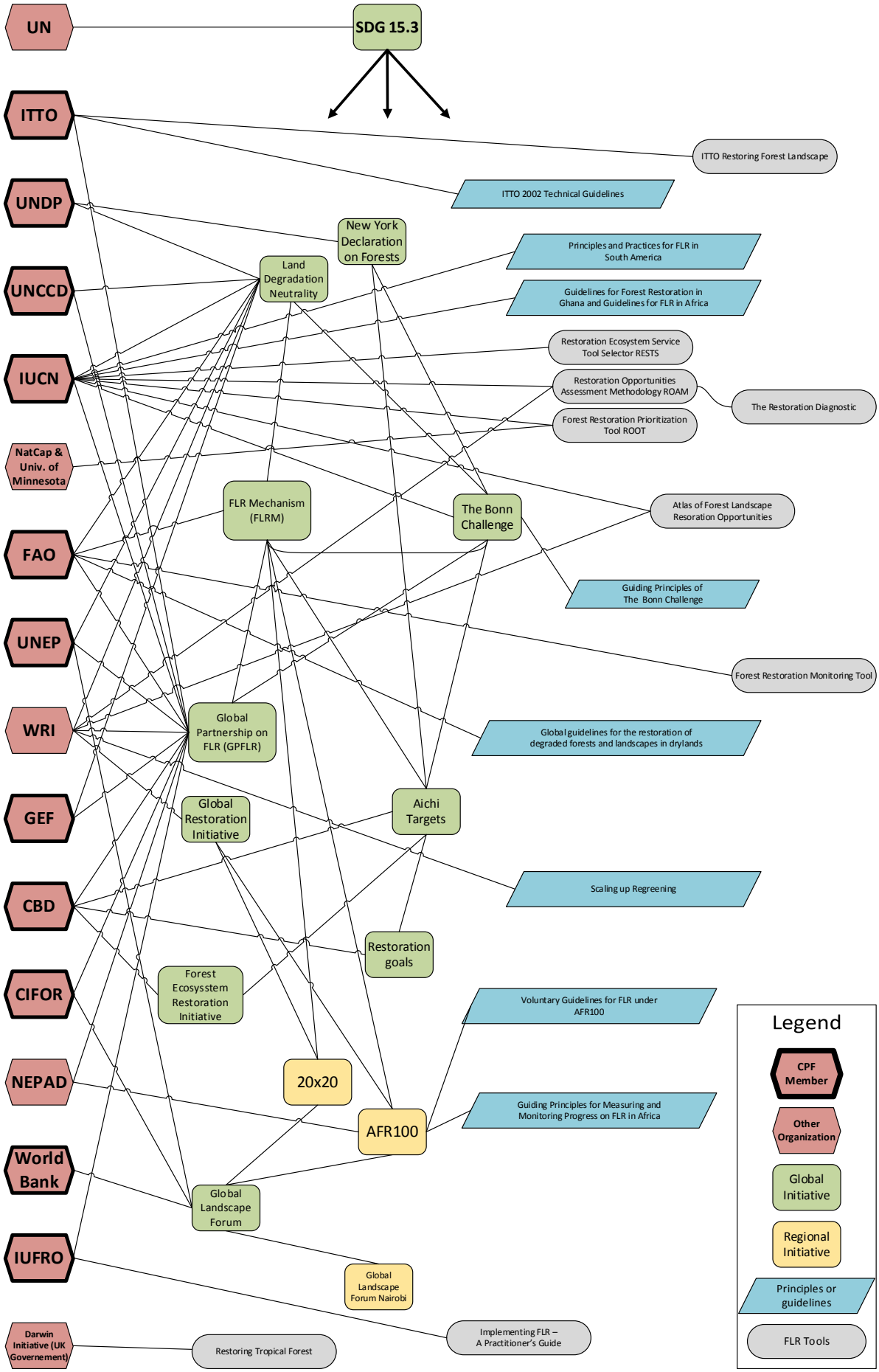

Figure 1 : Overview on the FLR initiatives, programmes, guidelines and processes.

5. Overview of tools to implement, monitor and evaluate FLR projects and programs

Global analysis has found more than two billion hectares of land that could benefit from restoration (Source). The main questions in this context are what do these opportunities look like at the landscape level and where should countries, organizations, and individuals interested in restoration begin?

There is a growing suite of tools from which to choose to assess and map restoration potential, identify opportunities, perform cost-benefit analyses, navigate policy and more" (infoflor 2018a).

5.1 Tools of the ITTO

The 2005 publication "Restoring forest landscapes - An introduction to the art and science of forest landscape restoration" ITTO/IUCN and IUCN (2005) is a tool giving guidance on implementing FLR and braking down FLR strategies on a site level. Its 14 chapters are focusing on four main aspects (ibid.):

- Building support and adaptive management strategies
- Understanding landscape mosaics and dynamics
- Strategies and management of restoration activities on a site level.
- Optimization and monitoring.

The tool also included an analytical part and recommendations on forest landscape issues that have not been included in the ITTO 2002 Restoration guidelines, namely (i) Site-level strategies for restoring forest functions on agricultural land including agroforestry; S(ii) scenario modelling to optimize outcomes and (iii) Monitoring and evaluating site-level impacts.

The tool further outlined what specific aspects must be considered and what questions must be asked if developing and managing a FLR process from the stage of planning to the stage of monitoring and adapting FLR activities. The guidance is backed with references to various case studies (ITTO/IUCN 2005).

5.2 Tools of the International Union for Conservation of Nature (IUCN)

Restoration Opportunities Assessment Methodology (ROAM) in cooperation with the WRI

The ROAM process provides an analytical framework that enables countries to identify suitable restoration techniques and priority areas for restoration. Developed by the IUCN and the WRI the " "is an in-depth step-by-step methodology to assess the groundwork for FLR work with practical steps for diverse stakeholders to restore landscapes at any scale on a national or sub-national level, as well as describing how those opportunities relate to food, water and energy security… (infoflor 2018b). A ROAM application can deliver six main products (IUCN 2014a; infoflor 2018b)

1. identify priority areas for restoration
2. prioritize relevant and feasible restoration intervention types across the assessment area
3. quantify costs and benefits of each intervention type
4. analyze the finance and investment options for restoration in the assessment area
5. estimate the values of additional carbon sequestered by these intervention types
6. come up with a diagnostic of 'restoration readiness' and strategies for addressing major policy and institutional bottlenecks.

When applying ROAM user are guided through a three step assessment (IUCN 2014a)

1. 1. Phase: Preparation and planning involving a series of discussions and meetings to help prepare and plan the assessment, culminating in a national inception workshop to share the plan and seek high-level endorsement of the assessment.
2. 2. Phase: Data collection and analysis, the core phase of ROAM. The data collection activities are followed by brief guidance on discrete analytical components.

3. 3. Phase: Results to recommendations: Testing the validity and relevance of the assessment results, further analyzing the policy and institutional implications of the results, boiling support for the assessment results among decision-makers and drafting policy and institutional recommendations and planning for next steps.

Recognizing the importance of tenure, the ROAM handbook includes also guidance that encourages practitioners to assess how existing tenure rights in areas targeted for restoration are likely to influence FLR implementation. ROAM processes are meant to be flexible and countries tailor their processes to fit their needs and capacities.

Restoration Ecosystem Service Tool Selector (RESTS)

Restoration Ecosystem Service Tool Selector (RESTS) developed by IUCN is a "decision framework for identifying models to estimate forest ecosystem services gains from restoration" (Christin et al. 2016; IUCN 2016a; infoflor 2018a). It aims to help specialist in finding the right ecosystem service assessment tool for their purpose. Specialist can "enter information about their decision context, services to be analyzed, and desired outputs. Tools are filtered and presented based on five evaluative criteria: scalability, cost, time requirements, handling of uncertainty, and applicability to benefit-cost analysis" (Christin et al. 2016) . RESTS cover and describes the following 13 assessments tools:

Table 3: Tools covered by RESTS (Christin et al. 2016)

Abbreviation	**Tool name**	**Developer**
ARIES	Artificial Intelligence for Ecosystem Services	Basque Centre for Climate Change (BC3)
Co$ting Nature	Co$ting Nature	King's College London and AmbioTEK
EcoMetrix	EcoMetrix	EcoMetrix Solutions Group and Parametrix
EnSym	Environmental Systems Modelling Platform	State of Victoria, Australia
Envision	Envision	Oregon State University
ESR for IA	Ecosystem Services Review for Impact Assessment	World Resources Institute
EVT	Ecosystem Valuation Toolkit	Earth Economics
InVEST	Integrated Valuation of Ecosystem Services and Tradeoffs	Natural Capital Project
LUCI	Land Utilisation and Capability Indicator	Victoria University of Wellington
MIMES	Multiscale Integrated Models of Ecosystem Services	Afordable Futures
NAIS	Natural Assets Information System	Spatial Informatics Group
SolVES	Social Values for Ecosystem Services	U.S. Geological Survey (USGS)
TESSA	Toolkit for Ecosystem Service Site-based Assessment	BirdLife Internationa

Forest Restoration Prioritization Tool (ROOT)

IUCN, the Natural Capital Project (NatCap) and the University of Minnesota have developed the Forest Restoration Prioritization Tool (ROOT) a free ecosystem services software tool that assists with FLR planning (IUCN 2016c). ROOT is a tool that optimizes the location of forest restoration activities to support increased ecosystem service benefits by minimizing the costs of trade-offs between projected ecosystem services (infoflor 2018a). The expected outcomes of a analysis using ROOT are (IUCN 2016c):

- Service maps representing how alternative restoration strategies would affect the provision of multiple ecosystem services;
- Tradeoff curves depicting the relationship between two alternative restoration objectives to assist users in identifying their optimal restoration strategy; and
- Restoration portfolios that identify optimal restoration strategies based on user-defined weights and constraints.

5.3 Tools of the World Resource Institute WRI

The Restoration Diagnostic

The WRI describes its restoration diagnostics as a method for developing FLR strategies by rapidly assessing the status of key success factors (Hanson et al. 2015, 1). The tool was developed in the framework of ROAM to help implementing findings of a ROAM process but the tool can also be used independently from ROAM (ibid., 12).

In its first chapters the tool features a set of comprehensive definitions on FLR, describes its benefits and lists important key success factors for FLR (Hanson et al. 2015, 17,20,30). In the second part on diagnostics the tool delivers practical and comprehensive checklists aiming to identify which key success factors for forest landscape restoration are already in place, which are partially in place, and which are missing within a country or landscape that has restoration opportunities (ibid.). To do so, the diagnostic uses the following three step approach (ibid., 38):

1. Selecting the “scope” or geographic boundary within which to apply the diagnostic (candidate landscape).
2. Evaluating whether or not key success factors for forest landscape restoration are in place for the candidate landscape.
3. Identify strategies to address missing factors. Identifying strategies to close gaps in those key success factors that are not in place or only partly in place in the candidate landscape.

The last chapters describes learnings form case studies in South America and Africa that were conducted using the Restoration Diagnostics and provides examples on using the methodology (Hanson et al. 2015, 59ff).

The Atlas of Forest and Landscape Restoration Opportunities

Hosted by the WRI in collaboration with the IUCN and the University of Maryland, the interactive atlas is an information management tool, which aims to help stakeholders and decision makers identify opportunities for restoration (Minnemeyer et al. 2014; GPFLR 2018a). The Atlas has been first published in 2009 and has been reviewed and expanded over time to cover today all main forest biomes. It contains interactive information on the following five main topics (GPFLR 2018a):

- Bonn Challenge Pledges
- Restoration Opportunities
- Forest Condition
- Current Forest Coverage
- Potential Forest Cover
- Human Pressure

5.4 Tool of the International Union of Forest Research Organizations (IUFRO)

Implementing Forest Landscape Restoration - A Practitioner's Guide

The 2017 IUFRO tool is developed as a modular package that focuses on a set of well delimintaed chapters including (i) Governance and Forest Landscape Restoration; (ii) Designing a Forest Landscape Restoration Projects; (iii) Technical Aspects of Forest Landscape Restoration Project Implementation; (iv) Monitoring Forest Landscape Restoration Projects; Climate Change Mitigation and Adaptation in Forest Landscape Restoration; and Communicating Forest Landscape Restoration Results (Stanturf et al. 2017).

The particular chapters of the guidelines are structured in explanatory sections and further readings as well as sections with advice for practical application sections also containing important key questions, checklists and other tools for the realization of FLR (Stanturf et al. 2017).

5.5 Tools of the FAO

Forest Restoration Monitoring Tool

The 2012 "Forest Restoration Monitoring Tool" of the FAO (2012a) is a checklist aiming to help its users to (i) assess the initial situation of a site that identified for FLR activities. Besides ecological and technical aspects, the policy framework is assessed too. In second step (ii) the field implementation is assessed and in last step (iii) monitoring and result checking are addressed (ibid.).

The tool is very easy to understand and provides comprehensive tools for quick assessments of FLR actions before, during and after FLR activities. It is a real checklist and thus, does not provide any theoretical background on FLR. Several questions asked in the checklists are only answerable if a good data basis exists.

5.6 Decision making tools for FLR by CIFOR

Decision support tools for forest landscape restoration: Current status and future outlook.

A new decision tool has been recently published by CIFOR (Chazdon and Guariguata 2018). The report assumes that restoration is the means to achieve many goals, and not simply a "solution" to solve problems of degradation. Forest landscape restoration is an active, long-term process to regain ecological integrity and enhance human well-being when forest cover, forest qualities and forest-based contributions to people are diminished. The report reviews existing knowledge and experience on support tools for FLR, including (i) Tools for preparation and assessment; (ii) Tools to evaluate potential restoration outcomes; and (iii) Tools for prioritization, spatial planning and species selection

It concludes that despite the many advances in the development and application of decision support tools in FLR, there is a gap in tools for the implementation of landscape-scale restoration initiatives and for guiding monitoring and adaptive management. The review also reveals that available tools primarily focus on assessing restoration opportunities at a broader scale, rather than within landscapes where implementation occurs. Evidence from research on community-based conservation and forest management suggests that tools for the empowerment, land rights and capacity building of local residents can help nurture strong coalitions of landscape restoration practitioners that apply adaptive management of restoration interventions and evaluate potential restoration scenarios in their own landscapes.

5.7 Others

Restoring Tropical Forests

Sponsored by the UK government through its Darwin Initiative and published by the Royal Botanic Gardens Kew Elliott et al. (2013) published the compendium “Restoring Tropical Forests – A practical guide” in 2013.

The book can be subdivided in the following three main parts:

1. Understanding and planning of FLR
2. Implementation in the field from nursing and planting over maintaining
3. Setting up forest restoration research units for monitoring

Even that some policy aspects are covered in the first part of the book, its real value lies in the detailed descriptions of activities to be conducted in the field when applying forest restoration. It is thus a real practitioner’s guideline. On more than 300 pages it gives advice on how to implement FLR in the field, for example which tools to use for planting trees and how to plant a tree correctly.

It seems to be the only tool in this FLR context that goes beyond the assessment, planning and monitoring stage of FLR and provides real “hands-on” advices for practical FRL implementation.

6. Financing FLR – a short overview

Major work has been undertaken over the past 2-3 years by several CPF members and other organizations to develop financing tools for forest landscape restoration. Also, quite a few analyses have been made to estimate the costs of FLR. Based on TEEB (2009) the average investment costs for restoring tropical forest are in the order of magnitude of 3'450 US$ per ha. To achieve the 150 million ha target of the Bonn challenge FAO/Global Mechanism of the UNCCD estimate the costs to USD 36 billion per year for all biomes based on estimated cost of USD 2380 per ha (FAO/UNCCD 2015b).

A new report of WRI by Ding et al. (2017) provides a comprehensive analysis of the benefits and costs of restoring land in countries around the world. Almost one-quarter of the world's arable land area has been degraded over the past 50 years because of soil erosion, salinization, peatland and wetland drainage, and forest degradation. The resulting damage, in terms of lost ecosystem goods and services, costs the world an estimated US$ 6.3 trillion a year. WRI estimated the funding needed for effective global forest and landscape restoration and forest conservation to around USD 300 to 350 billion annually but only USD 50 billion could be sourced over the past years of which more than 80% of the contribution came from public funding (Faruqi 2016).

IUCN (2018) makes a rough assessment of the benefits delivered when achieving the Bonn Challenge. Based on their assumptions, the restoration of 150 million hectares of degraded and deforested lands in all concerned biomes will create approximately US$ 84 billion per year in net benefits that could bring direct additional income opportunities for rural communities. About 90% of this value is potentially tradable, meaning that it encompasses market-related benefits. Achieving the 350-million-hectare goal of the Bonn Challenge would generate about US$ 170 billion per year in net benefits from watershed protection, improved crop yields and forest products, and could sequester up to 1.7 GT CO2e annually.

Forest restoration occurs prominently in the financing instruments linked to the UNFCCC and CBD. A recent analysis by the GEF Secretariat in its introduction to the new impact program on landscape restoration (August 2018) found restoration and reforestation to be the most frequently occurring themes among developing countries' Nationally Determined Contributions (NDCs), particularly under REDD+ and joint mitigation/adaptation programs, the National Biodiversity Strategies and Action Plans (NBSAPs), and National Action Plans (NAPs) – present in 98% of GEF-eligible countries' policy frameworks. Integrating forest landscape restoration into ongoing environment and development programmes, can be a promising option to maximize the impact of their investment (GEF 2017a).

The newly agreed GEF7 program cycle includes besides the regular STAR allocation[5] to the countries the so-called *Landscape Restoration Impact Program* with the objective to maintain a global network of resilient landscapes which are either transboundary or subnational in scope As a realistic target the Program aims at the restoration of 15 – 25 selected landscapes, with a total area coverage of 60 – 100 million hectares, including three main categories of land:

1. Degraded land (formerly productive land), through investments in sustainable land management, including agro-silvo-pastoral models and agro-ecological intensification;
2. A wide range of ecosystem types, including savannah, shrub and grasslands, wetlands, watersheds, estuaries, and mangroves using best practices for ecological restoration, which may include targeted eradication, management or control of Invasive Alien Species; and
3. Forest landscapes, applying a range of best practices and focusing on, but not limited to, cost-effective interventions such as natural regeneration, assisted natural regeneration, and forest protection to restore ecosystem functions.

The entry points for countries to apply to this GEF7 Impact programme are mainly the Bonn Challenge and other platforms with similar goals. Also, the new program builds upon the GEF Sustainable Forest Management investment program of GEF6. To this specific GEF7 impact program a basket funding is

[5] System for Transparent Allocation of Resources to the countries in the GEF mechanism

allocated (GEF 2017b), however in the moment of writing this report the amount of the specific funding is not known.

A considerable cost is estimated by FAO/FM (2018) to achieve the Sustainable Development Goal (SDG) 15.3 to achieve land degradation neutrality of 2 billion ha by the year 2030. The amount estimated for this target is US$ 318 billion per year (GPFLR 2018). Different types of investors are targeted to support the costs of FLR, including private sector funding that are primarily targeting financial returns, national budgets, international financial cooperation and development cooperation provided by OEDC donor countries international NGOs and foundations that are primarily targeting environmental and social returns, carbon financing and others.

In this respect it is important to underline that tendency is observed that classical development and economic cooperation funding is declining, and donor governments are turning more to multilateral types of funding. Thus, there is a need to turn to long-term financing solutions and increased reliance on the private sector and on instruments enabling new forms of funding with potential to be self-sustained, such as results-based payments and payments for ecosystem services integrated into value chains. Sources do exist for raising the necessary funds for forest and landscape restoration (FLR). They include besides the development cooperation resources, climate finance (particularly the Green Climate Fund), non-governmental organizations (NGOs), state budgets, environmental funds, crowdfunding and private sector investments.

FAO jointly with the Global Mechanism of the United Nations Convention to Combat Desertification (GM) launched in December 2015 a discussion paper on “Sustainable financing for forest and landscape restoration: opportunities, challenges, and the way forward”. The report highlights the need to create an enabling environment for private sector investments in FLR, in particular about supporting ongoing investment innovations through so-called impact funds and to bridging the gaps between project developers and investors in the design of bankable projects.

In fact, enabling FLR financing requires several key issues to be addressed. These are outlined in GPFLR documentation concept note and in the *afr 100 Initiative*, and include:

- The development of marketplaces for FLR is critical to promote interactions and discussions on mutual opportunities for FLR implementation and all stakeholders involved are called to support their creation and management”.
- Successful experiences of partnerships and alliances for FLR at different levels (global, regional, national and local) should be taken as a reference for further implementation of FLR; to this aim, information on good examples and lessons learned should be made available and widely disseminated.
- Developing a common language between project promoters and investors is key in bridging the existing gaps; to this aim, efforts should be made to harmonize guidelines, including concepts, definitions and terminology used by different groups of stakeholders and to develop a common vocabulary.

Public policy makers from developed and developing countries, including through using the ITTO as a platform, can play an important role in enabling the environment for FLR. As developed by the GPFLR initiative and further specified in the afr-100 initiative, resource mobilization for FLR can be supported by, *inter alia*:

- Integrating FLR in major country strategies and policies, including SDGs, and consequently in state budgets and public investment funds, and proofing these financing instruments against negative impacts on landscapes;
- Mobilizing Official Development Assistance (ODA) funds for FLR (whether as donor or beneficiary) and adapting the wide range of ODA instruments to FLR;
- Promoting FLR as a solution for joint climate change mitigation and adaptation (NDCs, NAMAs, NAPAs), targeting climate finance, and advocating for an FLR window in climate change instruments

such as the Global Environmental Facility; the Green Climate Fund and the Adaptation Fund besides others

- Developing monitoring systems for FLR expenditures and mechanisms for collecting data on the costs and benefits of FLR investments;
- Designing, adapting and implementing national and local financing mechanisms for FLR such as national and local forest funds;
- Using these financing instruments to implement public incentive schemes (e.g. payment for ecosystem services mechanisms) and coupling these schemes to investments in sustainable value chains to ensure a long-term self-sustaining financing strategy;
- Increasing engagement with the private sector, especially with pioneer private impact funds and other innovative initiatives such as layered funds that can benefit from the support of governments and public institutions;
- Building a legal and regulatory framework that makes landscapes “ready for investment” and attracts investors to FLR;
- Establishing risk mitigation mechanisms to engage FLR investors at scale;
- Promoting partnerships and alliances at local, national, (sub)regional and international levels, and contributing towards international FLR initiatives.

An international initiative of the Global Landscape Forum (GLF 2018a), supported by the IFC, has launched a process of building the Investment Case for Sustainable Landscapes and Restoration in May 2018. The outcomes of this process will be presented at the annual Global Landscapes Forum at the World Conference Center in Bonn on Dec. 1 and 2, 2018.

Related links:

Sustainable financing for forest and landscape restoration – Opportunities, challenges and the way forward (FAO/UNCCD 2015b)

Sustainable financing for forest and landscape restoration – The role of public policy makers (FAO/UNCCD 2016)

Sustainable financing for forest and landscape restoration – Key messages (FAO/UNCCD 2015a)

7. Conclusion and moving forward

7.1 Implementation of the ITTO 2002 restoration guidelines

Process of developing and promoting forest restoration guidelines in ITTO

During its Thirtieth Session in May 2001, the ITT-Council decided to develop Guidelines for Management of Secondary Tropical Forests, Tropical Forest Restoration and Rehabilitation of Degraded Forest Lands [Decision 6(XXX)]. The document was developed and approved by the Council during its Thirty-Second Session in May 2002 [Decision 3(XXXII)]. Apart from adopting the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests, Decision 3(XXXII) also called for the following:

1. Publish and widely disseminate the Guidelines;
2. Hold six sub-regional workshops to promote the understanding of the Guidelines, provide feedback and encourage further regional or country level initiatives in this area;
3. Publish and widely disseminate an information brochure summarizing the Guidelines;
4. Encourage member countries to apply the Guidelines on a pilot scale and submit project proposals to ITTO where appropriate;
5. Commend the Guidelines as an international reference standard to Members and the international community in general as a major contribution towards the sustainable utilization and conservation of tropical forests and their genetic resources; and
6. Strengthen the cooperation between ITTO and IUCN, WWF, FAO, CIFOR and other Organizations to implement the above activities on restoration, management and rehabilitation of degraded and secondary tropical forests.

The 2002 ITTO Guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests

The Guidelines were formulated between September 2001 and November 2002 with the support of two consultants[6] who were assisted by 14 international experts nominated by ITTO member countries and forest experts from ITTO, CIFOR, FAO, IUCN, WWF International. They met in an expert panel meeting in October 2001. The preparation of the guidelines was considered as part of a substantial effort by ITTO and its partners to deal with degraded forest and forest land in the wider context of SFM.

The Guidelines were developed in early 2000 in a time when forest (landscape) restoration was in its initial stages of discussion. It was grounded on first in-depth analysis that the extent of forest degradation in the tropics is vast; it was estimated that some 350 million hectares of tropical forest land have been so severely damaged that forests won't grow back spontaneously, while a further 500 million hectares have forest cover that is either degraded or has regrown after initial deforestation.

Such large areas of damaged forest and land were cause of concern, but also represented a potential resource of immense value. Thus, ITTC Council decided to develop on the issue of forest restoration and inform policy-makers, forest practitioners, extension workers and others who want to restore and manage degraded or secondary forests. The Guidelines stress that the policy, legal and social conditions in and outside the forest must be analyzed and addressed before restoration, management and rehabilitation activities are decided on. They point out that many people have a stake in the forest and any restoration, management or rehabilitation efforts must be made with their full participation. It was further noticed that tenure issues must be resolved, and transparent mechanisms for sorting out conflicts over property and access rights must be established. Also, a focus was given on the need to develop silvicultural techniques

[6] Same consultants who prepared the present report to the attention of the ITTC

that can be understood and implemented by owners of small areas of forest. The guidelines had clearly a focus on humid natural forest areas and excluded trees in agricultural landscapes.

Box 3: Purpose of the ITTO 2002 Guidelines

Purpose of ITTO's 2002 Guidelines

- A knowledge base for forest restoration of degraded (primary) forests & secondary forest management
- A planning tool at the local (FMU) and landscape level;
- A basis for stimulating best management practice
- A contribution to a policy framework for forest restoration and secondary forest management

Structure of the Guidelines

- Guidelines divided into two sections, with a total of 8 objectives, 49 principles & 160 recommended actions
- Section 1: Policy-planning level with 7 objectives (31 principles & 105 actions)
- Section 2: Stand level practice with 1 objective (18 principles & 55 actions)

Eight thematic objectives of the Guidelines

1. Attain commitment to the management and restoration of degraded and secondary forest landscapes
2. Formulate and implement supportive policies and appropriate legal frameworks
3. Empower local people and ensure the equitable sharing of costs and benefits
4. Employ integrated approaches to resource assessment, planning and management
5. Take an integrated and holistic approach to forest management, emphasizing environmental and social values
6. Promote economic efficiency and financial viability
7. Guarantee participatory monitoring and evaluation as a basis for adaptive management
8. Utilize appropriate ecological and silvicultural knowledge and efficient management practices

The Guidelines needed to be put into the institutional context in the years 2001/2002. ITT-Council strictly required that ITTO funding being focused on the management of tropical production forests mainly, with forest conservation being an accepted site-track of the operational work of ITTO. The Expert Group at the time had in mind to formulate broader Guidelines based on situating forests into a broader landscape concept, including the role of trees outside closed forests. This approach was however rejected by the Council and focus had to be set on the restoration of degraded natural ("primary" tropical forests, the particular role of managing secondary forest successions and rehabilitating degraded forest land that can be potentially restored, ecologically and economically. The niche of ITTO thus was intentionally set mainly within the boundaries of the PFE that is the resource base of tropical timber and the main playing field of ITTO's operational project portfolio. This policy limitation needs to be put into perspective when reviewing the 2002 ITTO Restoration guidelines in the light of todays expanded global portfolio on forest landscape restoration.

Regional and Sub-regional workshops to promote the understanding of the Guidelines 2003-2004[7]

Between April 2003 and January 2004, a total of six regional and sub-regional workshops were held in Chiang Mai, Thailand; Tarapoto, Peru; Kumasi, Ghana; Rio Hato, Panama; Libreville, Gabon and Bogor,

[7] A detailed report on the implementation and results of these workshops had been prepared by a consultant, James Gasana, in May 2004 under the title: "Regional Workshops on ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests".

Indonesia. The general objective of these workshops was to promote the understanding of the ITTO 2002 Restoration Guidelines, providing feedback and encouraging further regional or country level initiatives in forest restoration and secondary forest management. The wider aim was to put the Guidelines on the agenda of relevant ministries and forest administrations of developing member countries with degraded forests and make these aware of the benefits of using the Guidelines in their national and regional forest policy planning and implementation. The workshops were to help build a constituency in each of the countries concerned for the application and effective use of the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests.

The training was an interactive learning process based on participative adult learning techniques. The participants were given an opportunity to work together in groups and "think aloud together" about forest restoration. The training also included a one-day field exercise component. The exercise was organized to provide an illustration of learning by doing and to allow participants to experience in real life what forest landscape restoration means.

Overall, the six workshops were attended by 103 participants from 32 countries, comprising 76 from government agencies, 11 from NGOs, 3 from universities, and 13 from research institutions. The participants generally recognized that the Guidelines are filling a knowledge gap and were successful in clarifying the concepts and strategies of degraded forest restoration and land rehabilitation. It was further recognized that that the Guidelines can be adapted to the conditions and realities in the countries and should be incorporated in the national forestry programs and action plans.

Restoring forest landscapes: an introduction to the art and science of forest landscape restoration published in November 2005.

In 2005, ITTO, jointly with IUCN, published a technical report (ITTO Technical Report 23) that represented the latest thinking on the emerging concept of forest landscape restoration three years after the publication of the ITTO 2002 Guidelines. It was prepared to precise the issues listed in the Guidelines and to widen the field from forest restoration to forest landscape restoration and from policy to practice.

The report stated that the main aim of Restoring Forest Landscapes is to help forest-restoration practitioners to understand FLR, appreciate its benefits and start to implement it. Thus, while the ITTO *Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests* are aimed primarily at policy-makers, the ITTO Technical Report 23 targets field-level forest managers working in degraded forests and forest lands. The target group includes forest department staff, local communities or NGO staff involved in joint forest management, private-sector timber company staff, or local government planning officers. In 2005, FLR was still unknown to many of these groups, although they might already have adopted some of its principles in innovative forest restoration activities. One of the key messages in the report is that the technical knowledge is available to start FLR, based on a wide range of proven restoration techniques. As the limiting factors identified are a lack of understanding of the landscape-level approach, the other land-use policies outside the forest sector that can have a major influence on landscape-level dynamics, and, in particular, the landscape-level impacts of site-level land-uses. In addressing this last issue, the report highlighted the double-filter criterion of FLR, which states that the enhancement of human well-being and the restoration of ecological integrity cannot be traded off at the landscape level. This means that while specialization is inevitable and trade-offs unavoidable at the site level, the landscape-level sum of all site-level actions should attempt to balance the two objectives of enhanced human well-being and restored ecological integrity.

The ITTO-IUCN technical report was intended to serve as a bridge between the policy-level and broad FMU-level guide provided by the ITTO 2002 Guidelines and the context-specific field guides that was hoped to be developed following a series of national-level FLR workshops to be held during 2005 and 2006 (see beneath). The guide included, *inter alia*, to:

- use an adaptive management approach in planning and implementing an FLR initiative and support this approach through comprehensive monitoring and evaluation;

- understand and analyze the dynamics operating within a forest landscape;
- work with multiple stakeholder groups and address different, sometimes conflicting, interests;
- construct FLR scenario models to help make explicit the choices and trade-offs inherent in FLR planning and facilitate collaborative learning with stakeholder groups on which technical options to pursue; and
- evaluate the technical options available at the site level and consider the biophysical and socioeconomic factors that will influence the likely success of an FLR initiative.

From today's viewpoint, the ITTO-IUCN Technical Paper did not shape fundamentally ITTO's forest restoration agenda in the years after 2005, but the report was widely consulted and shaped somehow the global discussion of forest restoration. Indeed, it is one of the major sources on which many of today's FLR concepts are developed on.

Evaluation of ITTO restoration projects 2011

As part of a meta-evaluation of previously evaluated ITTO projects in the field of SFM, a specific review was undertaken on lessons learned and good practices for restoration, rehabilitation, reforestation and plantations (Thematic Summary Report No. 4). The report of three consultants (Markku Simula, Hosny El-Lakany and Ivan Tomaselli) was submitted in November 2011 to the 47th session of the ITCC in La Antigua, Guatemala. It is based on the evaluation of 11 ex-post evaluation reports of projects that have been implemented in the period between 1998 and 2008, thus partly prior to the preparation of the Guidelines. Nonetheless, the projects' most common activities related to the rehabilitation of degraded forest lands and establishing forest plantations as well as to supply other forest goods and services such as protective and amenity services. Associated research projects, often with experimental nature, are essential to improve knowledge on technical and economic aspects and ensure the establishment of enabling conditions for successful tree plantation programmes (especially for high-value and indigenous species). Such projects can also help establish and train national entities responsible for field activities and monitoring. All ITTO–funded projects in this domain are intended to contribute to the realization of the ITTO Objective 2000 and the sustainable management of forest resources, considering relevant ITTO guidelines. The projects must comply with the International Tropical Timber Agreement, particularly with Objective 1 (j) "*To encourage members to support and develop industrial tropical timber reforestation and forest management activities as well as rehabilitation of degraded forest land, with due regard for the interests of local communities dependent on forest resources*". The report concluded that the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Forests which specifically address the challenges of restoration of fragile and impoverished land and degraded forests was useful. It noted further restoration projects involving enrichment planting can have significant impacts when:

- Guidelines on enrichment planting techniques are developed and used nationally;
- ITTO's guidelines for restoration provide a useful framework for such national guidelines;
- Adequate reconnaissance surveys of the areas to be planted are undertaken to match species to site conditions
- Accumulating knowledge is used in further development of techniques and practices;
- Establishing wildlife corridors and other approaches to improve connectivity in fragmented forests hampered by timber harvesting and other land use practices
- The establishment of agroforestry plantations by local farmers can be a viable alternative economic activity to pure tree plantations in the rehabilitation of some degraded areas.

The outcome of the evaluation of projects can be interpreted as being somewhat meager from the point of view of the application of the 2002 ITTO Restoration Guidelines. Indeed, the ITTO Policy process post-2002 was not able to develop a functional action program for the implementation of forest restoration projects with a clearly defined funding mechanism through the ITTO project cycle nor through its Action Plans and did not find the financial resources necessary to promote a major program on forest restoration. It was left to the countries to submit forest restoration projects into the regular ITTO project cycle that notoriously was

suffering of lack of funding. Therefore, contrarily to the development in other CPF organizations, ITTO was unable to develop an operational forest restoration portfolio in its producer member countries.

Assessing the ITTO guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests. Case studies of Ghana, Indonesia and Mexico, November 2016.

In 2015, ITTO commissioned a report prepared by Kathleen Buckingham and Sarah Weber from the World Resources Institute (WRI) as part of its contribution to the newly created Global Partnership for Forest Landscape Restoration (GPFLR) to increase understanding of the factors to be considered in successful forest and landscape restoration and rehabilitation of degraded forests in the tropics. The report presents a review of restoration activities in project sites in Africa, Asia and Latin America. ITTO tasked forestry professionals in Ghana, Indonesia and Mexico to assess sites according to the ITTO guidelines. The report presented a summary of the main lessons learned and recommendations for the development of a revised framework.

The report critically reviewed the ITTO 2002 Restoration Guidelines, but from a recent viewpoint (years 2015 and 2016), when the wider FLR process was already in full swing globally and the knowledge base was expanded. Thus, the conclusion is fully justified that the ITTO Guidelines needs a thorough revision and that clear focus areas for a revised Guidelines need to be defined.

The main outcomes of the assessment report can be summarized as follows:

- The assessment report recognizes that the ITTO 2002 Guidelines were prepared to highlight the increasing importance of the current and potential roles of degraded and secondary forests in tropical landscapes. With most of the primary forests gone in many tropical countries, degraded primary forests and secondary forests are becoming the predominant forest types in many tropical timber-producing countries. They are a major part of many rural landscapes, and their importance in the supply of goods and services is growing rapidly. If properly restored and managed, degraded primary forests and secondary forests can provide environmental benefits such as watershed and soil protection, land stabilization, biodiversity values, and carbon sequestration
- The assessment report rightly noted that the ITTO 2002 Guidelines were created over ten years ago. Since then, the restoration movement has gained momentum and many publications, frameworks and toolkits have tried to enable landscape restoration
- The ITTO 2002 Guidelines in its current form however have had limited use due to a lack of awareness by forestry managers, professionals and practitioners at different levels. For example, in Indonesia, out of the eight projects surveyed, only one project had consulted the guidelines in the formulation process, even though four were ITTO-funded projects. Experts agree that the guidelines need significant revision regarding their structure and presentation, as well as detail and user friendliness. The revisions seek to provide a simple structure, merge the overlapping principles and use simplified wording instead of scientific terminology. Moreover, the plethora of recommendations and criteria can often overwhelm managers Since sustainable livelihood activities are a key focus of all restoration programs, the structure of the revised guidelines should aim to be directly applicable to stakeholders' needs and be presented in national languages [recommendation from Indonesia]. The recommended actions are very site-specific and therefore have limited utility across landscapes.
- The report of Buckingham and Weber provides good analytical elements to update the 2002 Guidelines and strengthen ITTO's comparative advantage within the Global Partnership for Forest Landscape Restoration (GPFLR). Possible future key areas of focus for ITTO's guidelines and principles are identified and shortly presented. Also, linking the reviewed guidelines to the flow of newer practical guidelines, including the *Restoration Opportunities Assessment Methodology (ROAM)* (Maginnis et al.2014) and the *Restoration Diagnostic* (Hansen et al.2015), is well taken and should inform the revision of the ITTO 2002 Guidelines.

- Clear recommendations on how to address the revision of the 2002 Guidelines are also comprised in the report; they relate, in summary to the following three areas of concern:
- Identify ITTO's comparative advantage within the GPFLR and utilize this to fill gaps in restoration methodologies and toolkits
- Align the revision of ITTO's 2002 guidelines with global emerging issues; and
- Utilize the GPFLR to create visibility of the ITTO Guidelines and to support the implementation of the global landscape restoration initiatives.

7.2 What can we learn from the variety of FLR Initiatives?

A critical look on the proliferation of concepts, approaches, policies and guidelines is needed

Most of the initiatives, principles and guidelines do not leave the policy level and are rather generic when it comes to implementation. Their impact on the ground is not certain as there is often no clear practical guidance on how to implement the initiatives, guidelines or policies. This is often because the initiatives or guidelines try to be very comprehensive in terms of spatial proliferation (the spatial scope is often too broad).

Having said that, it is evident that the existing guidelines overall are generic on purpose and wide in scope, both thematically (broad definition for FLR) and geographically. The question is if the new CPF/ITTO Guidelines will build on these and will be able to offer complementary, more practically oriented guidance for specific scenarios and FLR focus?

Learning from the FLR initiatives and tools developed to broaden the scope of the new Guidelines

CPF members need to express their views on what would be the specifics of the new CPF/ITTO Guidelines. ITTC needs to formulate its demands as well, e.g. the focus of the revised guidelines and the target audience. The ITTO 2002 Guidelines were clearly focused on degraded natural tropical forests and degraded forest lands and meant to be a practitioner's guidance document. It had not the ambition to set principles and policy recommendations at broader scale. As the new guidelines will be articulated with the full participation of interested CPF members, these elements will need to be discussed thoroughly (Bangkok workshop, November 2018).

How can the existing new guidelines and tools be integrated into a new focused ITTO Guidelines?

The tools developed by IUCN (ROAM, RESTS, ROOT, LDSF), WRI (Restoration Diagnostics), IUFRO (Stoplight tool, FLAT and others) and the FAO (Forest Restoration Monitoring Tool) for assessing degraded forests and restored forests comprise useful approaches to be considered in the implementation of FLR. As they deal with upstream and downstream processes of on the ground FLR-activities, they could/should become integrated parts of the guidelines. The Forthcoming Expert meeting in Bangkok might discuss if a three-stage set of guidelines could be developed that include, assessment of degradation (ROAM etc.), restoration (ITTO guidelines) and assessment of success (FAO).

A particular niche for developing a reviewed ITTO (CPF) Forest Restoration Guidelines?

ITTO's mandate is the promotion of sustainable forest management and conservation of tropical forests, both natural forests and timber plantations. Thus, the ITTO 2002 Guidelines defined clearly the terms of restoration and rehabilitation from an ecological and silvicultural viewpoint, in the sense to restore productive capacities of the tropical (humid) forests.

Today, however, the use of the term (forest) restoration is well beyond the ecology-circle. Restoration is an umbrella term that has penetrated the policy arena. Some countries have just accepted this single term, but others still identify other main strategies, i.e. rehabilitation and reclamation. The term recuperation (recovery?) is also popular as it can be easily understood by people on the ground.

The forthcoming Expert Meeting needs to agree on the specifics of revised CPF/ITTO Guidelines. It also needs to discuss the terminology used when addressing concrete implementation of FLR at field level.

Considering the increased interest in FLR globally, it is important to define the specific role that ITTO, as one of the pioneers in developing concepts of forest restoration, can play in future to support countries in the overall concepts and to contribute to successful FLR for the benefit of local people and the global community. It remains worth to discuss concretely what are the specific activities within a country's overall FLR national commitment that could fall in the mandate of ITTO. For more specifics, see chapter 7.3).

Finally, in reviewing ITTO's Restoration Guidelines it is worth to consider such guidelines in the overall context of SFM of tropical forests and climate change, and concretely in the framework of implementing REDD+ strategies in the countries. e.g. addressing "Forest Degradation" as element in REDD+ needs clear guidance on how to restore degraded forests, in respect to their lost functionality, to the situation of the carbon pools and forests' capacity to deliver goods and services overall. Also, addressing vulnerability of forest ecosystems and social systems (of people who depend on forest resources) are central elements in forest-based adaptation programs to Climate Change. The initial idea expressed in *Global forest leaders' forum on forest restoration and climate change in September 2008 at the World Bank* and to promote ITTO as the technical leader for "forest restoration" as opposed to "forest degradation" within a broader concept of Forest Landscape Restoration could also be subject of further discussions.

7.3 Issues to discuss for preparing CPF/ITTO Restoration Guidelines for tropical forest (landscapes)

Initial work on the conceptualization of the restoration guidelines with focus on restoring degraded forests and forest lands; critical points to be defined with ITTO and the Bangkok Workshop in November 2018, including, *inter alia:*

(1) Focus of the new Guidelines

Will they focus on restoring degraded (production, protection) forest and forest lands in the humid and sub-humid tropics or within the boundaries of the Permanent Forest Estate? Restricting the focus on the PFE would leave out so-called mosaic landscapes, i.e. where various land uses coexist (forests and woodlands, pastures, croplands, wetlands…)[8].

(2) Restoration for what purposes

Following the FLR principle of "restor[ing] multiple functions for multiple benefits", the Guidelines will provide guidance for restoring degraded forests and forest lands (or degraded landscapes in general?) for one or more primary objectives, e.g. to recover or create opportunities for enhancing: timber productivity, biodiversity, wildlife, food security & nutrition, diversification and income, water and soil protection, carbon sequestration, environmental services, recreational services.

(3) Restoration scenarios and options

A first consideration of degraded forest landscapes where restoration interventions are needed is presented in Table 3. These can be defined as "restoration scenarios" (degradation drivers, social actors, restoration-related variables and indicators etc. not defined yet). These scenarios tell us *what* needs to be restored. The other columns tell us about *how* – the main restoration options (or strategies), and *why* - the intended objectives. Each restoration option includes interventions or techniques that can vary depending on the local context, the degree of degradation, the main objective, the resources

[8] The main challenges and rewards for FLR are in tropical mosaic landscapes. As pointed out by De Pinto and Begeladze (2017): "A forest landscape restoration approach that meaningfully integrates agriculture can facilitate the implementation of restoration plans on large amounts of land… The overall positive outcomes are strongly dependent on how widely adopted conservation practices are, which points to the importance for policy makers to find and promote solutions to long-standing problems, such as the need for well-functioning extension services, proper amounts of good-quality information for farmers, and reliable and trustworthy institutions".

available etc. One could also include a column for the “restoration outcome” (linked to the objectives and social actors benefitting, among other possible variables).

The list of restoration options includes:

- Restoration of degraded forests – Example of interventions/techniques:
  - Suppress/ Address drivers of degradation (e.g. unplanned logging, over extraction of NTFP, overgrazing, fire, etc.)
  - Assisted natural regeneration (various techniques)
  - Silvicultural tending (various techniques)
  - Enrichment planting (various techniques)
- Rehabilitation of degraded forest land – Example of interventions/techniques:
  - Suppress/ address drivers of degradation
  - Assisted natural regeneration
  - Elimination of exotic invaders
  - Enrichment planting
  - Tree plantation (simple tree monocultures or multispecies/ multifunctional plantings)
- Ecological restoration
- Promotion of natural regeneration on degraded lands and marginal agricultural sites
- Management of secondary forests
- Rehabilitation of degraded riparian vegetation
- Integration of trees in agricultural landscapes outside forests (Agroforestry systems)
- Integration of trees in pastoral/ livestock landscapes outside forests (Silvopastoral systems)
- Conservation agricultural/ grazing practices
- Conservation measures
- Mangrove restoration & rehabilitation practices

Table 3 : Possible regeneration scenario

Possible RESTORATION SCENARIOS	FLR OPTIONS	FLR OBJECTIVES – BENEFITS															
		timber	NTFP	firewood	biomass/carbon stock	fodder	wildlife habitat	shade	enhance food production	sequester carbon	enhance biodiversity values	protect downstream water	reduce erosion	enhance crop productivity	improve community	enhance adaptation to	provide recreation, cultural,
1) Forest production areas *(production forests in concessions, community land, private land…)*	Restoration of degraded forests	X	X				X			X	X				X	X	X
	Management of secondary forests	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
	Rehabilitation of degraded forest land	X	X	X	X		X		X	X	X	X	X		X	X	X
2) Forest protected areas *(public land, private land)*	Ecological restoration						X			X	X	X	X			X	X
	Rehabilitation of degraded forest land		X	X			X		X		X	X	X		X	X	X
3) Riparian strips *(public, community, private land)*	Conservation measures											X	X			X	
	Ecological restoration						X	X			X	X	X			X	X
	Rehabilitation of degraded riparian vegetation		X	X		X	X	X	X		X	X	X		X	X	X
4) Regenerating forest areas in mosaic landscapes *(private land, community land)*	Promotion of natural regeneration on degraded lands and marginal agricultural sites			X		X	X	X	X		X				X		
	Management of secondary forests	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
	Integration of trees in agricultural landscapes outside forests (Agroforestry systems)	X	X	X		X		X	X		X			X	X	X	
	Integration of trees in pastoral/ livestock landscapes outside forests (Silvopastoral systems)	X	X	X		X		X						X	X	X	
	Creation of planted forests (simple tree monocultures or multispecies/ multifunctional plantings)	X	X	X	X		X		X	X	X	X	X		X	X	
5) Degraded agricultural areas *(private, community land)*	Conservation agricultural practices								X			X	X	X	X		
	Agroforestry systems	X	X	X		X		X	X		X			X	X	X	
6) Degraded pasture/ grazing areas *(private, community land)*	Conservation grazing practices								X			X	X	X	X		
	Silvopastoral systems	X	X	X		X		X						X	X	X	
8) Degraded mangrove areas	Mangrove restoration & rehabilitation practices	X	X	X			X		X	X	X	X[9]	X[1]		X	X	X

[9] Protect coastal areas

(4) Scope of the revised Guidelines

The scope could encompass both the policy level as well as the technical/ operational level. On the latter, the main purpose of the new Guidelines could be to provide guidance on practical implementation of FLR under different scenarios. Some of the key elements where practitioners would need practical guidance and examples would include:

- Diagnosis – Assessment: situation & opportunities
- Mainstreaming FLR in national development
- Cross-sectoral dialogue and planning at the landscape scale
- Land-use planning – Territorial development (participatory, negotiated)
- Objective setting
- Tools (Chazdon & Guariguata 2018): Preparation & assessment; Evaluation of potential restoration outcomes; Prioritization, spatial planning and species selection
- Integrated landscape management - Agriculture-forest interface
- Technological innovations. since the 2002 ITTO Guidelines (e.g. spatial mapping, key ecological factors to favor connectivity in fragmented landscapes, species for restoration under different scenarios/types of degradation, mycorrhizal inoculation to increase survival etc)
- Capacity development – Project preparation & support
- Funding (public, private) - Scaling-up investment
- Cost-effective monitoring schemes

(5) The ITTO 2002 Guidelines and the FLR Principles

A central question for the preparation of the revised guidelines will be: How do the ITTO 2002 Guidelines address the FLR Principles recently adopted by the GPFLR? The expert meeting will need to define on what is missing (on both ends), and what elements needs to be emphasized.

The assumption is that the revised Guidelines should be based on *globally agreed FLR Principles to establish a common understanding on FLR and guide the efforts of GPFLR members.*

Table 4 beneath presents a first attempt to link the GPFLR principles to the ITTO 2002 Guidelines

Table 4 : GPFLR Principles and links to the objectives and principles of the ITTO 2002 Guidelines

GPFLR 2018 PRINCIPLES (WRI 2018 Principles)	**ITTO 2002 Guidelines for the restoration management and rehabilitation of degraded and secondary forests**		**Comment**
	OBJETIVES	PRINCIPLES	
1. Focus on Landscape [P1] (WRI-P1. Focus on landscapes)	I. Attain commitment to the management and restoration of degraded land and secondary forest landscapes	P1. Landscape context P2. Livelihood contexts P3. Information/ Communication	The landscape focus is there, but the concept and practical approaches of integrated landscape management would need to be considered.
2. Engage Stakeholders and Support Participatory Governance [P4, P5, P9] (WRI-P5. Involve stakeholders)	II. Formulate and implement supportive policies and appropriate legal frameworks	P4. Governance P5. Property and access rights P6. Public institutions P7. Decentralization	Yes, it's there but the need for cross-sectoral articulation and institutional coordination & collaboration is not sufficiently elaborated.
3. Restore multiple functions for multiple benefits [P11, P13] (WRI-P3. Allow for multiple benefits) (WRI-P4. Recognize that a suite of interventions are possible) (WRI-P2. Restore ecological functionality)	III. Empower local people and ensure the equitable sharing of costs and benefits	P8. Stakeholder participation P9. Social equity P10. Traditional knowledge	There is more evidence and awareness today about the impacts of drivers of degradation on landscapes and about functional landscapes. How to restore functionality for what in different scenarios?
4. Conserve and enhance natural ecosystems within landscapes P11, P12] (WRI-P8. Avoid conversion of natural ecosystems)	IV. Employ integrated approaches to resource assessment, planning and management	P11. Land-use options P12. Environmental assessment P13. Multiple-use	The link between this FLR principle and what's in the Guidelines is somehow weak. Need to develop practical guidance for this particular FLR principle, maybe linking with the Voluntary Guidelines for SFM
5. Tailor to the local context using a variety of approaches [P10, P14 to P24] (WRI-P6. Tailor to local conditions)	V. Take and adaptive and holistic approach to forest management, emphasizing environmental and social values	P14. Adaptive management P15. Socio-economic objectives P16. Causes of degradation P17. Forest and climate change P18. Silvicultural analysis P19. Natural succession P20. Landscape restrictions P21. Biological diversity P22. Local benefits from biodiversity P23. Low-impact harvesting P24. Soil fertility	Well covered. Maybe the Guidelines could be tailored to specific restoration scenarios or regional contexts. Relevant examples will be important.
6. Manage adaptively for long-term resilience [P14, P17, P20, P22] (WRI-P7. Manage adaptively)	VI. Promote economic efficiency and financial viability	P25. Economic viability P26. Resource allocation P27. Local income opportunities	Well covered. Concrete examples to consider.
	VII. Guarantee participatory monitoring and evaluation as a basis for adaptive management	P28. Diagnosis P29. Monitoring P30. Applied research P31. Knowledge-sharing	
	VIII. Utilize appropriate ecological and silvicultural knowledge and efficient management practices	P32. Sustainable yield management P33. Simple silvicultural practices P34. Regeneration capacity P35. Restrictions in site conditions P36. Key species P37. Weed and animal pest control P38. Role of multi-purpose species P39. Role of existing plantations P40. Multiple-use function P41. Species diversity P42. Species selection P43. Silviculture only on best sites P44. Advanced growth P45. Stand structures P46. Carbon sequestration P47. Natural stand dynamics P48. Close-to-nature silviculture P49. Enrichment planting	

What is still missing in the current process of FLR overall:

- A clear policy-focus (that can guide countries and support wider development processes)
- Tenure & resource use rights (however work in ongoing)
- Market strategies and value chains for restoration products and services
- Economic considerations (FLR principles do not explicitly address these)
- Economically viable and successful restoration projects (as case examples)
- Partnership building at country level
- Business case for restoration investments (attractiveness for private sector)
- Forest fragmentation and strategies to build/enhance connectivity

These missing questions should be discussed in the forthcoming Expert Panel Meeting.

Further questions to take into consideration in preparation of the Bangkok Expert Meeting:

- Review the scope of the 2002 ITTO guidelines: humid tropical forests (against FAO's dry forest guidelines)?
- Accordingly review recommended actions but keeping distinction between Section 1 (policy level) and section 2 (stand/landscape level)?
- Practical guidelines, to be implemented by professional forests, or generally by all land users (particularly in mosaic landscapes?
- How to include the regional (W-/C-/E/-Africa, SE Asia, LAC) context/specificities in the FLR-GL? E.g. through enriching the Guidelines with existing case studies
- What is needed to upscale and out scale FLR? How to go beyond nice guidelines and recommended actions and provide inroads into the conditions and incentives that land users need to invest in restoring forests and forest lands.
- How to deal with the various scales of FLR planning and implementation (national, subnational, landscape and even the land unit/household/community…)?
- How to include the "new notions" of MRV, Safeguards, technics and technology?

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9. Annexes

Annex 1. Main Findings of relevant reports on FLR implementation

Results, experiences and conclusions

The Experience of Foresters in Re-establishment and Habitat Restoration (Pottinger 1993)

- The size and situation of the re-establishment area should be considered
- Restoration projects require a broad genetic base in order to succeed
- Physical or biological modification of the area may need to be carried out prior to re-establishment
- It is essential to have a thorough knowledge of both the ecological requirements of the species and the ecology of the site in question (of particular importance is an appreciation of plant succession for the restoration area)
- The reasons for loss of the species from the area must be examined.
- A system which will regenerate naturally should be aimed for
- Costs involved and the level of management expertise available must be considered
- Re-establishing species must be protected from pests, including weeds
- Enrichment planting should be considered as a means to establish the species
- The planting strategy (size of plants and where they are planted) must be carefully worked out
- The use of nurse crops to assist the growth of the selected species should be considered
- Seed of local provenance should be used whenever possible
- As broad a genetic base as possible should be used for re-establishment within the constraints imposed by seed provenance
- The possibilities and effect of genetic contamination from nearby sources should be considered
- Local people should be encouraged to become involved in the project wherever possible
- The surrounding area should be managed where possible to support the re-establishment project
- Long-term management of the re-establishment site should be incorporated into the project at the beginning

Five Years of Implementing Forest landscape Restoration – Lessons to date. Experiences compiled from the WWF network during a study tour of Spain and Portugal. (Dudley and Aldrich 2006)

- Forest landscape restoration is a forward-looking approach that aims to strengthen the resilience of forest landscapes and to keep a variety of future options open for both people and biodiversity, rather than always aiming to restore forests to their original state
- Diverse restoration strategies are needed; tree planting is often only one of many techniques within restoration projects
- Stakeholders should be involved early and actively in planning and programme development and implementation
- It is important to balance public goods and services with private benefits to ensure long-term sustainability of the restored forest landscape
- Implementation of broad scale forest restoration strategies remains a challenge, particularly in terms of scaling up from site-based projects to landscape or eco-regional scale
- The long time-scale involved in restoration means that social and environmental conditions may change during the lifetime of a project – for instance pressures and opportunities often change radically when forests are no longer used for subsistence
- Monitoring and evaluation is needed at the start of a project at both site and landscape scale, to set a baseline and assess outcomes, and should ideally be part of a participatory stakeholder process to agree the range of goods and services that forests should provide

- Successful restoration projects need to address long-term funding, through multiple strategies including for instance utilizing the economic benefits of forests, such as ecosystem services, or redirecting existing economic incentives
- Success will be much easier in conditions where there is good governance and lack of corruption
- A diverse range of partnerships is critically important to successful restoration, often including companies, private ownership, research institutions, development / social NGOs and other local community organizations

Principles and Practice of Forest Landscape Restoration: Case studies from the drylands of Latin America (Newton and Tejedor 2011)

- Understanding the factors responsible for forest loss and degradation is essential for FLR approaches to be developed (Dudley, 2007). Remote sensing and GIS techniques can be used together with statistical modelling approaches to identify both the pattern and the proximate causes of forest loss
- The factors affecting patterns of species composition and richness were found to vary markedly between the different study landscapes. Restoration is likely to be more successful in terms of impact on species richness when restoration activities are conducted at higher elevations than in lowland areas, and when the size of the remnant fragments is relatively large. However, the conditions of each landscape must be analyzed separately. Similarly, the history of local anthropogenic disturbance should be investigated to fully understand the processes that account for the present patterns of species richness in each region. Such an understanding is necessary if FLR is to be effective in restoring biodiversity
- Restoration efforts in drylands must confront the long dry season affecting seedling survival during any transplanting effort. Transplantation should take place at the beginning of the rainy season, or be undertaken in rainy years. Supplemental irrigation may also be effective in supporting tree establishment. The use of nurse species was found to be important for protecting seedlings from desiccation, thus improving seedling survival and initial growth. Exclusion of large herbivores is also often essential for successful tree establishment
- Natural regeneration can be encouraged by protecting successional areas from herbivores, fire, and selective cutting; enrichment planting is an appropriate method in early successional sites lacking non re-sprouting and key primary tree species; and mixed species plantations can be established on highly degraded sites
- Local knowledge must be taken into account for the selection of tree species; local people should participate in the selection process and be aware of the importance of forest recovery owing to the environmental services that it provides
- Key problems related to the factors responsible for forest loss and degradation that need to be addressed in future FLR initiatives include: the loss and degradation include the loss of awareness of the importance of native forest species among local people, disengagement of formal education from local knowledge and traditions, insufficient information on the potential economic or ecological importance of native plants, lack of commercialization channels for native forest products, conflicting governmental policies, the introduction of exotic species, and a lack of coordination among stakeholders involved in forest management and conservation
- Forest fragmentation and degradation affect patterns of genetic variation at different scales. FLR approaches should consider patterns of within- and between-population genetic variation which in turn will be key determinants of restoration success
- A sound analysis of the objectives of restoration is a necessary pre-condition to the success of any restoration plan. Once the objectives have been identified in consultation with stakeholders,

decision analysis techniques may be applied to the actual definition of restoration sites. Multicriteria evaluation (MCE) techniques are particularly suitable for their ability to combine multiple decision criteria, incorporate the values of different stakeholders and deal with spatially-explicit information

Restoring forests: What constitutes success in the twenty-first century? (Jacobs et al. 2015)

- The concept of adaptive management has reached forest restoration, i.e., iteratively defining and refining objectives and practices in a simultaneous process using a flexible framework within the context of a rapidly changing world
- We must aim to restore, rehabilitate, and in some cases design resistant and resilient forest ecosystems that can adapt to emerging circumstances, i.e., ecosystems with a high adaptive capacity
- The vast amount of land requiring restoration implies the need for spatial prioritization of restoration efforts according to cost-benefit analysis that includes ecological risks
- We must reconsider the suite of species incorporated into restoration with the aim of moving toward more stress resistant and competitive combinations in the longer term
- While native species should be prioritized whenever possible, non-native species may serve an important role under some circumstances
- Nursery propagation and seedling quality assessment must shift from a focus on reforestation practices designed to promote fast growth on cutover sites toward promotion of seedling survival through greater stress resistance
- An improved ability to generalize among plant functional groups in ecological niche adaptations is needed to overcome the diverse suite of biotic and abiotic site-limiting factors characteristic of restoration sites
- In degraded environments, site preparation is often necessary to restore structural elements and sources of microsite diversity, with low-impact mechanical site preparation being of increasing emphasis on restoration sites
- The many benefits that society gains from protected and restored forests, i.e., their ecosystem goods and services, requires forest restoration to consider multiple objectives and approaches to minimize trade-offs in achieving these objectives
- The capacity for new concepts and technologies to be adopted by managers and accepted by society will depend on effective technology transfer and a community-based approach to forest restoration

Management and restoration practices in degraded landscapes of Southern Africa and requirements for up-scaling (Chirwa et al. 2015b)

- Natural regeneration of different forms especially through coppicing is the predominant form of restoration in dry forests and woodlands of southern Africa. This may carry different forms of silvicultural management practices (complete coppice; coppice with standards and selective cutting; pollarding, pruning and lopping) depending on the end products
- The conditions for up-scaling successful restoration practices identified in southern Africa include the following: 1) Enabling policies for community-based approach including clear cut land tenure and equitable benefit sharing: 2) Recognition of local knowledge< 3) Institutional support for implementation of restoration activities: 4) Income generating initiatives through marketing and value adding of natural resources: 5) Taking on financial opportunities from CDM mechanism including REDD

Management and restoration practices in degraded landscapes of Eastern Africa and requirements for up-scaling (Chirwa et al. 2015a)

- The practice of joint forest management (JFM) and/or participatory forest management (PFM) has been identified as potential strategy in facilitating restoration and sustainable management of the forest resources. This strategy entails active involvement of local communities, supported by the new forestry legislation, and is by far the most successful and promising option for restoration of the large areas of degraded land in eastern Africa
- Natural regeneration through enclosures are prevalent in livestock farming areas, artificial regeneration through woodlots or farm forests are prioritized in some countries for various reasons including commercialization of tree planting in Uganda as out-growers, energy production in Rwanda and reforestation of bare hills in Ethiopia

Forest landscape restoration in Asia-Pacific forests (FAO/RECOFTC 2016)

- Overall, there is a strong need for countries to formulate supportive policies and legal frameworks for implementing FLR approaches. Minimally, these would have to cover governance issues, property, tenure and access rights, strengthening capacity of public institutions, engaging the private sector and markets, and decentralizing control and decision-making to local bodies. Considering FLR approaches are still evolving, additional research and sharing of experiences on good practices are vital
- For FLR to work, forestry agencies will have to adopt a more flexible and adaptive approach, move towards decentralization and devolution of authority and responsibility, work at building partnerships with a range of stakeholders and start shifting towards market economies
- The technical interventions of FLR need to consider the broader landscape, and have to be integrated with conservation and social benefits
- Research should be directed for determining the criteria for selection of sites with high potential for restoration in terms of social (institutional acceptance, social compatibility, local support) and economic criteria (transaction costs, how the initiatives will translate into revenues and if existing infrastructure can be utilized for the purpose)
- Forestry departments need to develop appropriate codes of practice for FLR in the field, and likewise the procedures for working with other stakeholders (e.g. households, communities, the private sector)
- Need to formulate appropriate regulations regarding the types of species, their numbers, genetic quality and proportion of land to be maintained under forest cover
- Policy recommendations are crucial for the successful implementation of FLR approaches. There is a clear need to develop policies that promote FLR approaches; they should result in regulations and laws allowing natural forests to remain and favour restoration programmes that will simultaneously restore the productivity of degraded forest lands, increase their value in the range of goods and services provided and employing the native species in the restoration initiatives
- Policies for restoration should fulfil traditional needs for wider acceptance by society. More than ever, these policies should empower rural people and small landholders so they will become more engaged in forest management
- For FLR to succeed, policy instruments have to be embedded in a solid economic base. Considering FLR approaches are going to bring about social benefits and public goods that are not accounted for in the market economy, the policies need to buffer such schemes from market failures
- Policy formulation can be guided better by initiating small FLR initiatives, which will provide feedback on which approaches are cost effective, ecologically favourable and have higher social acceptance

- Economic analysis of pilot FLR initiatives can guide policy formulation more effectively in the use of incentives. Overall, these pilot trials can also demonstrate the value of FLR in relation to traditional approaches
- It is critical that stakeholders, especially those at grassroots levels and smallholders, are included in the policy formulation process
- Since the FLR approach requires some stakeholders to set aside lands which otherwise would be used for other purposes, this can be a recipe for conflicts. For this reason, there is need for agreements among all stakeholders; they should be included in the design and decision-making process from the start. Their participation has to be equitable and their critical roles have to be clarified, including their access and use rights when it comes to the sharing of benefits and costs
- Local communities should be considered as the main actors and involved in the decision-making process for FLR
- In implementing FLR, issues of land tenure, incentives, access to resources and management rights have to be clarified and agreements have to be arrived at which are mutually respected. There is a need to develop criteria for landholders' preference for selection of areas where restoration should be conducted using the most effective and economical methods. This can be combined with collaborative land-use planning which takes into account the diverse needs of rural populations in the implementation of FLR programmes
- The most persuasive argument for implementing FLR is economics – can it pay for itself? First there is a need to determine what incentives can be provided for the programmes to work. If these incentives are coupled with PES (that cover provision of water, carbon sequestration, climate regulation, soil protection, biodiversity, other services) the case for FLR programmes can be strengthened. Furthermore, forestry departments can compare how effective FLR programmes are in the forests and lands that can be restored compared with conventional approaches. The inclusion of the private sector with commercially valued schemes would further expand FLR programmes. International and regional schemes can be invited to assist in broadening the programmes

Revisiting the Factors Shaping Outcomes for Forest and Landscape Restoration in Sub-Saharan Africa: A Way Forward for Policy, Practice and Research. (Djenontin et al. 2018)

Moving from restoration commitments to implementing and achieving FLR promises is challenging. Many barriers undermine the implementation of FLR (and SLM) schemes. Although some are common, their relative roles are not well understood or well-articulated. There persist critical limiting factors that prevent FLR interventions from delivering on their promises. The lack of concrete and adequate financial support (beyond mere promises or short project cycles) for FLR initiatives, exacerbated by the apparent reluctance of the private sector to invest in restoration, is at the center of such obstacles.

What value does FLR add to previous initiatives to warrant the recent excitement and confidence in the approach, beyond repackaging of the elements under a different label? What are the concepts, theoretical and organizing principles, goals, approaches, and processes that undergird the FLR approach? Is there a common understanding of these concepts within the literature and in practice as the FLR concept/approach takes off? What lessons do previous integrative efforts addressing similar goals as the FLR approach offer? What separates the rhetoric, reality, and prospects of FLR?

This research addresses the broad question of how contemporary FLR (and SLM) initiatives can achieve their set goals.

The researchers investigate barriers and drivers of successful FLR projects, schemes, and programs by building on the core concepts associated with FLR and the related theoretical knowledge base.

These enabling/impeding factors include socioeconomic, policy, institutional, and organizational dynamics, and their interplay.

The literature review, informed by the conceptual framework, revealed scale as a useful organizing frame for factors and processes that influence the outcomes of FLR. Three scale-based categories helped in effectively untangling the nature, extent/significance, and operational level of the factors, as well as the main stakeholders and their relative levels of power and influence. They include: (1) factors related to individual managers making land-use decisions at the household or individual farm level; (2) factors operating at the institutional meso-scale of FLR projects and programs; and (3) governance factors, along with policy and institutional arrangements manifest as local, national, and broader influences.

Core Concepts of the Forest and Landscape Restoration Approach

The novelty in the discourse around the latest surge in land restoration built around trees within and outside forests in SSA is often blurry, especially vis-a-vis long-standing environmental resource management paradigms. Thus, the FLR concept, and indeed movement, engenders controversy regarding the understanding and added benefits of FLR in the land-use community.

The new restoration movement being championed through FLR is explicitly anthropocentric, rather than a call to return to “original” states and patterns of land use.

Broadening restoration into FLR opens options to effectively deal with socioecological uncertainties, such as climate change, economic challenges, and social change.
In this paper, the researchers use Forest and Landscape Restoration to reflect the FLR philosophy of being inclusive of both forest restoration and other dimensions of landscape restoration, such as agricultural and wooded landscapes.

Sustainable Land Management and FLR

There are important similarities and synergies between FLR and sustainable land management (SLM) approaches. FLR concepts and practices generally incorporate concepts, practices, and tools from the SLM approach. Liniger et al. [52] define SLM as land-use systems that foster appropriate management practices to enable land users to maximize the socioeconomic benefits for their land-based livelihoods, while maintaining or improving the ecological functions of the land resources. Some posit SLM as the best approach to address land degradation.

SLM practices often consist of simple, low-cost and local-knowledge-based farming practices, techniques, and technologies that have emerged from innovative farmers and have been tested and enhanced by state or nongovernmental organizations.

The repertoire of SLM practices is large and applied in different environmental management initiatives and approaches across SSA. Practices include soil fertility and crop management techniques, soil erosion control, water harvesting techniques, grazing, and forest management schemes. SLM practices also take into account the packaged techniques promoted under conservation agriculture. Climate-smart agriculture interventions also draw on these SLM techniques.

In summary, overlaps and synergies between FLR and SLM have resulted in the proponents of FLR integrating SLM concepts and practices into the conceptualization and implementation of restoration approaches and packages. The FLR/SLM marriage facilitates and reflects the spatial extension of sustainable forest management into agrarian landscapes.

There is no single approach, tool, or technique (silver bullet) to solve all restoration problems. Landscape restoration can involve tree planting, assisted natural regeneration, agroforestry, or other SLM technologies and practices. The choice of FLR approach and combinations thereof depends on the context, including land-use types and the restoration objectives.

The core concepts associated with FLR, including the broad definition and unifying idea of landscape, and the diverse and multiple interacting actors operating at different, nested scales, underscores the need for a multi-scalar approach to holistically identify the major factors that influence success or failure of FLR schemes.

Natural regeneration as a tool for large-scale forest restoration in the tropics: prospects and challenges Chazdon R.L.; Guariguata M (20016) Biotropica 48(6): 716-730

A major global effort to enable cost-effective natural regeneration is needed to achieve ambitious forest and landscape restoration goals. Natural forest regeneration can potentially play a major role in large-scale landscape restoration in tropical regions. Here, we focus on the conditions that favor natural regeneration within tropical forest landscapes. We illustrate cases where large-scale natural regeneration followed forest clearing and non-forest land use, and describe the social and ecological factors that drove these local forest transitions. The self-organizing processes that create naturally regenerating forests and natural regeneration in planted forests promote local genetic adaptation, foster native species with known traditional uses, create spatial and temporal heterogeneity, and sustain local biodiversity and biotic interactions. These features confer greater ecosystem resilience in the face of future shocks and disturbances. We discuss economic, social, and legal issues that challenge natural regeneration in tropical landscapes. We conclude by suggesting ways to enable natural regeneration to become an effective tool for implementing large-scale forest and landscape restoration. Major research and policy priorities include: identifying and modeling the ecological and economic conditions where natural regeneration is a viable and favorable land-use option, developing monitoring protocols for natural regeneration that can be carried out by local communities, and developing enabling incentives, governance structures, and regulatory conditions that promote the stewardship of naturally regenerating forests. Aligning restoration goals and practices with natural regeneration can achieve the best possible outcome for achieving multiple social and environmental benefits at minimal cost.

Annex 2. References to other important background papers in FLR by year of publication

Sorted by year of publication

Gender matters in Forest Landscape Restoration: A framework for design and evaluation (Basnett et al. 2017)

Partnering with nature: The case for natural regeneration in forest and landscape restoration (Chazdon et al. 2017).

The risks of large-scale biosequestration in the context of Carbon Dioxide Removal (De la Plazza et al. 2017)

Cropland restoration as an essential component to the forest landscape restoration approach: Global effects of widescale adoption (De Pinto et al. 2017)

Implementing Forest Landscape Restoration Initiatives: Tenure, Governance, and Equity Considerations (McLain et al. 2017)

Protocol for Monitoring Tropical Forest Restoration (Viani et al. 2017)

Decision adopted by the conference of the parties to the Convention on Biological Diversity: Ecosystem restoration (CBD 2016a)

Success from the ground up: Participatory monitoring and forest restoration (Evans and Guariguata 2016)

Restoring Forest Landscapes (IUFRO 2016)

Restoration of forest ecosystems and landscapes as contribution to the Aichi Biodiversity Targets (IUCN 2016b)

A Cost-Benefit Framework for Analyzing Forest Landscape Restoration Decisions (IUCN 2015)

Climate-smart landscapes: Multifunctionality in practice (Minang 2015)

A Landscape Perspective on Monitoring & Evaluation for Sustainable Land Management: Trainers' Manual (Buck et al. 2014)

Biofuels and degraded land (IUCN 2014b)

Contemporary forest restoration: A review emphasizing function (Stanturf et al. 2014)

Socioeconomic Indicators for Forest Restoration Projects (Egan and Estrada-Bustillo 2011)

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