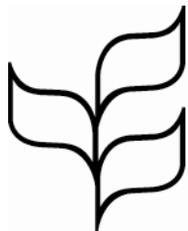




CBD



**Convention on
Biological Diversity**

Distr.
GENERAL

UNEP/CBD/COP/13/INF/11
25 November 2016

ENGLISH ONLY

CONFERENCE OF THE PARTIES TO THE
CONVENTION ON BIOLOGICAL DIVERSITY
Thirteenth meeting
Cancun, Mexico, 4-17 December 2016
Item 10 of the provisional agenda*

**RESTORATION OF FOREST ECOSYSTEMS AND LANDSCAPES AS CONTRIBUTION TO
THE AICHI BIODIVERSITY TARGETS**

Note by the Executive Secretary

INTRODUCTION

1. The Executive Secretary is circulating herewith, for the information of participants in the thirteenth meeting of the Conference of the Parties, a report entitled “Restoration of forest ecosystems and landscapes as contribution to the Aichi Biodiversity Targets” prepared by the International Union for Conservation of Nature (IUCN).
2. The report provides an introduction to the concept of Forest Landscape Restoration (FLR) and draws linkages between the implementation of various countries’ pledges for FLR, taken under the Bonn Challenge, and the achievement of Aichi Biodiversity Targets. Activities conducted under the Bonn challenge have the potential to contribute to support a range of Aichi Biodiversity Targets, in particular Targets 5 and 15. Aichi Biodiversity Targets 5 and 15 are relevant to items 9, 10, 13 and 19 of the provisional agenda of the thirteenth meeting of the Conference of the Parties.
3. The report provides country-specific data generated through assessments of opportunities for forest landscape restoration, with details on how various restoration actions can contribute to the Aichi Biodiversity Targets in a given national context. This information could help countries refine the alignment of their Forest Landscape Restoration strategies with their national biodiversity strategy and actions plan. These linkages will be further explored through the collaboration between IUCN and the Forest Ecosystem Restoration initiative in 2017, through regional capacity-building and direct support activities.

* UNEP/CBD/COP/13/1.



Restoration of forest ecosystems and landscapes as contribution to the Aichi Biodiversity Targets

Information document submitted by IUCN



Global Forest and Climate Change Programme

Supported by:



Federal Ministry
for the Environment, Nature Conservation
Building and Nuclear Safety

based on a decision of the German Bundestag



from the British people

This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supports this initiative on the basis of a decision adopted by the German Bundestag. UK aid from the UK government also provided support to this publication through their 'Improving the way knowledge on forests is understood and used internationally (KNOWFOR)' grant to IUCN.

Restoration of forest ecosystems and landscapes as contribution to the Aichi Biodiversity Targets

Information document submitted by IUCN



The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN or other participating organisations concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN or other participating organisations.

This report has been produced by IUCN's Global Forest and Climate Change Programme as an information document in advance of the Convention on Biological Diversity Conference of Parties 13 (CBD COP13), November 2016.

Published by: IUCN, Gland, Switzerland
copyright: © International Union for Conservation of Nature and Natural Resources

Reproduction of this publication for educational or other non-commercial purposes is authorized without prior written permission from the copyright holder provided the source is fully acknowledged. Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: IUCN (2016). *Restoration of forest ecosystems and landscapes as contribution to the Aichi Biodiversity Targets*. Gland, Switzerland

Authors: Rebecca Andrasko, Craig Beatty, Saadia Bobtoya Owusu-Amofah, Charles Karangwa, Peter Mbile, Miguel Moraes, Melinka Najera, Leander Raes, Carole Saint-Laurent, Silvio Simonit, Adriana Vidal, IUCN

Project coordinator: Adriana Vidal, IUCN

Publication

coordinator: Sandra Caya, IUCN

Layout: Corbett Nash, IUCN

Cover photo: Craig Beatty/IUCN 2016

Available from: IUCN (International Union for Conservation of Nature)
Global Forest and Climate Change Programme
Rue Mauverney 28
1196 Gland, Switzerland
forests@iucn.org
www.iucn.org/theme/forests

Executive summary

This document provides information on how implementing forest landscape restoration (FLR) at the jurisdictional and national level can offer countries a way to recover degraded forests and bring back key forest ecosystem functionalities in a way that will increase biodiversity levels in a landscape while contributing to achieving several Aichi Biodiversity Targets.

One approach to prepare to implement FLR is through the application of the Restoration Opportunities Assessment Methodology (ROAM), which provides a flexible and affordable framework for countries to rapidly identify and analyse areas that are suitable for FLR and to identify specific priority areas at a national or sub-national level.

When carrying out restoration opportunities assessments, countries can identify several land use transitions which have intrinsic connexions with the biodiversity conservation and enhancement priorities included in the Aichi Biodiversity Targets. This includes uses pertaining to sustainable productive land uses such as the implementation of agroforestry systems or sustainable forest management, and identification of areas that are important for biodiversity conservation or that will improve the connectivity among high biodiversity areas (Target 11).

The main focus of these assessments is to optimise the positive impacts of land use transitions on key ecosystem services, including carbon sequestration (Target 15), the provision of the hydrological services water yield and sediment retention (Target 14), and nutrient retention (Target 8). Understanding the direct monetary impacts of land use transitions for landholders (individual or communal), and the impacts on the provision of key ecosystem services are the main outputs for developing restoration incentive instruments (Target 3). Overall they serve as input in the development

of the financial strategy of the different restoration programmes (Target 20). Restoration opportunities assessments also have the potential to identify and prioritise restoration in areas that are of specific concern to threatened species and biodiversity (Target 12), to design restoration strategies that support the increase and maintenance of genetic diversity in cultivars (Target 13) and to ensure that restoration actions are not vectors for the establishment and spread of invasive alien species (Target 9). Finally, measuring the provision of ecosystem services from different land uses is one way to demonstrate the value of high biodiversity areas (Target 1).

There are good examples from countries that are already implementing FLR activities, having integrated them as part of their national biodiversity strategies and action plans (NBSAPs) or having pledged actions on FLR under a number of other international commitments and initiatives that seek to support climate change mitigation, adaptation, improve water provision, and meet other social and economic development goals. This includes the 38 national and sub-national governments, the private sector and restoration alliances that have committed close to 125 million hectares to the Bonn Challenge – a global effort to bring 150 million hectares into restoration by 2020 and 350 million hectares by 2030.

Selected examples of findings from the restoration assessments carried out in nine jurisdictions where Bonn Challenge commitments have been or could be made at the national or sub-national level can be found in the tables annexed to this document.

The restoration activities or FLR interventions included in the tables were identified as the most appropriate for the national situation and respond to the results of the biophysical, economic and institutional analyses and

consultations/feedback from stakeholders. Furthermore, the tables show information on the Aichi Biodiversity Targets that best connect to the appropriate restoration techniques identified by the country assessments.

The integration of these commitments and initiatives into what countries report to the Convention on Biological Diversity (CBD) would be the logical next step in the process of accelerating action to implement the Aichi

Biodiversity Targets. In order to materialise this potential, countries could take advantage of activities related to the restoration of forest ecosystems at a landscape scale that are currently under implementation at the national or jurisdictional level. As such, FLR could be the emerging global nature-based solution for addressing biodiversity conservation, climate change adaptation and mitigation, poverty alleviation, and economic growth objectives effectively and coherently.

Contents

Executive summary	iii
Introduction	1
Restoration of forest ecosystems at a landscape scale	2
Forest landscape restoration through the Bonn Challenge	4
Forest landscape restoration to achieve Aichi Biodiversity Targets	5
Forest landscape restoration in national strategies	7
Assessment of landscape restoration opportunities and the relevant Aichi Biodiversity Targets ..	9
Brazil	10
Costa Rica	10
Côte d'Ivoire	10
El Salvador	10
Ghana	10
Guatemala	11
Mexico	11
Nicaragua	12
Rwanda	12
Mainstreaming biodiversity for wellbeing through forest landscape restoration	13
Conclusion	14
References	15
Annex: Synthesis tables of restoration opportunities assessments and relevant Aichi Biodiversity Targets	16
Brazil (Espírito Santo State)	16
Costa Rica	17
Côte d'Ivoire	18
El Salvador	19
Ghana	20
Guatemala	22
Mexico (Yucatan Peninsula)	23
Nicaragua	24
Rwanda	25

Introduction

This document presents information on restoration of forest ecosystems at a landscape scale – known as forest landscape restoration or FLR – to support the theme of the Convention on Biological Diversity – Conference of the Parties 13 (CBD COP13) on *Mainstreaming Biodiversity for Wellbeing*, and the dissemination of best practices for enhanced implementation of the Convention, and more specifically, the Aichi Biodiversity Targets.

This document provides information on how implementing FLR at the jurisdictional and national level can offer countries a solid way to recover degraded forests and bring back key forest ecosystem functionalities in a way that will increase biodiversity levels in a landscape,

while contributing to achieving several Aichi Biodiversity Targets. This is illustrated with examples by Parties that have already identified, or could easily identify the potential of FLR for meeting their biodiversity goals and targets.

Another opportunity to bolster achievement of the Aichi Biodiversity Targets through restoration of forest landscapes is to connect the Bonn Challenge to the Aichi Biodiversity Targets. The Bonn Challenge is a global effort to bring 150 million hectares of degraded and deforested lands into restoration by 2020 and at least 350 million hectares by 2030. A number of Parties to the CBD have made and are implementing commitments to the Bonn Challenge.

Restoration of forest ecosystems at a landscape scale

FLR is the ongoing process of regaining ecological functionality and enhancing human wellbeing across deforested or degraded forest landscapes. A restored forest landscape could include naturally regenerated areas, agroforestry, on-farm trees, mangroves, protected wildlife reserves, plantings of trees and other woody plants such as bamboos, and more.

- **FLR restores “forward”** to meet present and future needs and to offer multiple benefits and land uses over time.
- **FLR is not just about “forests”** – it focuses on increasing the number, health and/or diversity of plants in an area. The term “forests” always includes trees and other woody plants, but may also include other features such as mangroves, windbreaks, or small open areas depending on the landscape in question.

- **FLR is about “landscapes”** – it involves entire watersheds, jurisdictions, or even countries – areas in which many different land uses interact.
- **FLR is about “restoration”** – it involves enhancing the biological productivity of an area in order to achieve multiple benefits for people and nature.
- **FLR is “ongoing”** – it requires a multi-year vision of the ecological functions and benefits to human wellbeing that can be gained; in addition to the tangible deliverables such as jobs, income and carbon sequestration that begin to flow right away.

A fuller reference to what FLR encompasses can be found in the principles that guide the application of the Restoration Opportunities Assessment Methodology (ROAM):



Graphic by EcoAgriculture Partners, photo by Nate Dappen

1. Restoring an agreed, balanced package of landscape functions; not only increasing forest cover and not trying to re-establish the forests of the past;
2. Working across whole landscapes containing mosaics of land uses; not just individual sites, so trade-offs can be made;
3. Using of a range of restoration options from natural regeneration to tree planting as appropriate;
4. Active negotiation and collaboration among stakeholders;
5. Avoiding further reduction or conversion of natural forest cover and other ecosystems; and
6. Tailoring to local conditions; continuously learning and adapting to changes in these landscapes.

FLR offers a biological and socio-economic transformation of large areas of degraded and deforested land into resilient, multifunctional assets that can contribute to local and national economies, sequester significant amounts of

carbon, strengthen food and clean water supplies and safeguard biodiversity. This is accomplished through balancing a mosaic of interdependent land uses, including agriculture, agroforestry systems and improved fallow systems, ecological corridors, discrete areas of forests and woodlands, and riparian plantings to protect waterways to create nature-based solutions to landscape challenges.

Considering and restoring entire landscapes, as opposed to individual sites, is critical in the FLR approach. Landscapes are often seen as sets of overlapping ecological, social and economic networks within a specific area. This makes landscapes an ideal, albeit malleable unit for planning and decision making as it allows for the integration of various sector plans and programmes into a spatial context, combining natural resources management with environmental and livelihood considerations. People and institutions are therefore perceived as an integrated part of the landscape system rather than as external agents operating without impunity.

Forest landscape restoration through the Bonn Challenge

According to a [global assessment of restoration potential](#) carried out for the Global Partnership on Forest Landscape Restoration, there may be more than two billion hectares of deforested and degraded land around the world where opportunities for some type of restoration may be found.

The Bonn Challenge aims to bring 150 million hectares of degraded and deforested land under restoration by 2020 and at least 350 million hectares by 2030. In September 2011, at a high-level event co-hosted by the German Ministry of the Environment and IUCN, the Bonn Challenge 2020 target was launched by leaders from around the world. It was endorsed and extended to 2030 by the 2014 New York Declaration on Forests. This target is consistent with Aichi Target 15 which calls for the restoration of 15% of degraded ecosystems by 2020, while contributing to other Aichi Biodiversity Targets.

The Bonn Challenge is an implementation vehicle for national priorities such as water and food security, disaster risk reduction and rural development as well as for international biodiversity, climate change and land degradation

commitments. As of November 2016, the Bonn Challenge has reached almost 125 million hectares pledged from 38 national and sub-national governments, restoration alliances and the private sector from around the globe. With the recent launch of the [Bonn Challenge Barometer](#) it will be possible to measure progress of implementation of these restoration pledges in terms of policy commitments and financing, in-country technical knowledge gained, and on-ground progress which will include estimation of biodiversity and livelihood benefits from restoration activities.

Many of the countries that are Bonn Challenge partners have incorporated their restoration plans into their National Biodiversity Strategies and Action Plans (NBSAPs) and National Reports to the CBD¹. There are also Parties to the CBD currently implementing FLR activities and planning that have the opportunity to align these activities within their NBSAPs and report on those as progress to the CBD but have not yet done so. Finally, there are Parties who are currently undertaking activities that could be considered FLR and would contribute to the Bonn Challenge, but are not yet recognised as such.

¹ For more information on countries and their restoration targets in their NBSAPs & National Reports please visit www.infoflr.org

Forest landscape restoration to achieve Aichi Biodiversity Targets

FLR supports the overall vision of the Aichi Biodiversity Targets: *By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.* Ecosystem connectivity and resilience are key concerns for the FLR practitioner when weighing how restoration activities apply to an entire landscape – including the genesis and flow of ecosystem services. Through connecting and restoring ecosystems that have been degraded, habitat and biodiversity will improve and certain FLR activities, if properly targeted, can genuinely support the increase in populations of threatened species.

FLR supports Aichi Biodiversity Targets such as:

- minimisation of harmful measures to biodiversity (Target 3);
- sustainable use of productive lands ensuring conservation of biodiversity (Target 7);
- reduction of soil pollution and other pollution sources levels to ensure the functioning of ecosystems and biodiversity (Target 8);
- invasive alien species control, eradication, and reduction (Target 9);
- conservation of natural protected areas (Target 11);
- prevention of extinction and improvement of conservation of known threatened species (Target 12);
- maintenance, erosion prevention and safeguarding of the genetic diversity of socio-economically and culturally valuable species (Target 13);
- restoration of ecosystems that provide essential ecosystem and livelihood services (Target 14); ecosystem resilience and contribution of biodiversity to carbon stocks enhancement through conservation and restoration of ecosystems (Target 15); and
- substantially increasing mobilization of financial resources to effectively implement the CBD Strategic Plan (Target 20).

While relevant to all of these, FLR can perhaps make the greatest contribution to Aichi Biodiversity Targets 5, 14 and 15. Restoration strategies can support Target 5 by prioritising decisions on land use that avoid a reduction of natural forest cover. FLR can also directly reduce and address or eliminate the loss and conversion of primary and secondary natural forest by providing sustainable resources and livelihoods. One of the largest threats to natural habitats is expanding agricultural land into primary habitat.

The Aichi Biodiversity Targets most relevant to FLR:

- **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.”
- **Target 14:** “By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and wellbeing, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.”
- **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 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.”

Through restoration of degraded land, FLR can increase agricultural productivity and reduce or eliminate the need for new agricultural land, thereby reducing pressures on natural habitats. By using ecological intensification techniques and carefully controlling the impacts of pesticides and fertiliser runoff, the increase in productivity in agricultural areas can be achieved while limiting impacts on agro-biodiversity and on species that use agricultural land for their habitat.

Moreover, through comprehensive planning and stakeholder engagement, activities that put pressure on forests (agriculture, livestock) can be shifted to more suitable areas for production. Restoration of mixed-use agricultural land in areas adjacent to primary habitat can also provide higher quality matrix habitat between forest fragments and lead to the creation of wildlife corridors that can improve the resilience of certain species to climate change.

FLR is a multi-stakeholder process that works at a landscape level to identify and implement restoration that leads to 'functional landscapes'. In order to accomplish this, it is often critical to measure and monitor ecosystem services. Not only does the process of FLR often require an assessment of ecosystem services, but it also requires that the benefits of restoration are measured, and many of the indicators of success are measured in terms of ecosystem services.

Since these activities are generally at a landscape scale, this provides an important source of attributable information to stakeholders and international conventions, such as the CBD, on the existence and maintenance of ecosystem services, as well as on the equitable distribution of economic and non-economic benefits resulting from restoration activities. All of this is a direct contribution to Target 14, and this broad and inclusive stakeholder-driven process will help to ensure that benefits and costs associated with ecosystem services are equitably distributed.

With regards to Target 15, FLR practices seek to improve the long-term ecological and social resilience and productivity of currently degraded and deforested landscapes. Moreover, restoration involves a wide range of strategies from on-farm trees to planting of trees and other woody plants that have a direct effect on the volume of carbon capture in climate change mitigation schemes. FLR implementation naturally adopts an ecosystem-based adaptation approach by considering biodiversity, ecosystem services, and social welfare and resilience when defining adaptation strategies to climate change.

FLR promotes the idea that landscapes can have multiple functions that provide essential services for people like food and livelihoods by accommodating multiple land uses, such as protected areas, agroforestry or new tree plantings. Restoration interventions planned within a landscape context can serve as a vehicle for countries to meet different Aichi Biodiversity Targets in a coherent and mutually supportive way.

Several of these arguments have been emphasised in the 'Short Term Action Plan on Restoration' annexed in the draft recommendation on ecosystem restoration (UNEP/CBD/SBSTTA/REC/XX/12) which will be discussed during COP13. This Short Term Action Plan *"aims to facilitate ecosystem restoration across all types of habitat (...) including forests' under the understanding that restoration is '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 wellbeing while reducing environmental risks and scarcities."*

The purpose of this Action Plan is to reinforce the relevance of FLR as a nature-based solution to restore deforested and degraded areas to support the achievement of the Aichi Biodiversity Targets.

Forest landscape restoration in national strategies

As mentioned before, several countries have included restoration of forest biodiversity and ecosystems as part of their national biodiversity strategies. In national reports and NBSAPs, forest ecosystems prominently appear with most countries providing quantitative time series of data of forest cover, often in a spatially explicit manner. Most national targets make an explicit reference to forest ecosystems and link them with plans that include restoration of degraded and deforested ecosystems, restoration of lands preventing deforestation and forest degradation, and promotion of restorative measures in ecosystems, among others. Encouragingly, issues of scale and broader thinking beyond the site level are coming through these strategies and plans. On the other hand, few of these national targets were found to be 'measurable' and 'time-bound', or to mirror the content of Aichi Target 5, 14 and 15.

Outside of national targets set under NBSAPs, several Parties to the CBD have pledged actions on FLR under a number of international commitments and initiatives that seek to support climate change mitigation, adaptation, improve water provision and meet other social and economic development goals. The integration of these commitments and initiatives into what countries report to the CBD appears to be the logical next step into the process of accelerating action to implement the Aichi Biodiversity Targets. In order to materialise this potential, countries could take advantage of FLR related activities currently under implementation at the national or jurisdictional level. Through applying FLR opportunity assessments it is possible to identify many ongoing activities compatible with biodiversity conservation and restoration.

NBSAPs examples where FLR has been incorporated

In 2012, Colombia submitted its [National Policy for the Integrated Management of Biodiversity and its Ecosystem Services](#) (NPIMBES) to the CBD. In the NPIMBES, Colombia proposed a number of restoration-focused national targets to be completed by 2014. A key goal of Colombia's during the period of 2012 to 2014 was to implement measures to confront environmental change, which it planned to do by restoring or rehabilitating 280,000 hectares of land for protective aims, including connecting biological corridors and preventing deforestation, and by preventing the deforestation of 200,000 hectares out of the total 61 million hectares of natural forest.

Peru's [National Strategy on Biological Diversity and Action Plan](#) details goals and plans for the period of 2014 to 2021. To achieve and operationalise the broader objectives laid out in the National Strategy, Peru created a complementary Action Plan on Biological Diversity for 2014 to 2018, which includes several goals that are relevant to restoration. One of the six strategic objectives of the National Strategy is to reduce the direct and indirect consequences for biodiversity and ecosystem processes pressures by 2021. A subcategory of this strategic objective is that by 2021, Peru plans to reduce the degradation of ecosystems by 5%, with an emphasis on reducing degradation to forests and fragile ecosystems. In support of this goal, the Action Plan states that Peru will reduce ecosystem degradation by 2% by 2018. Another goal mentioned in the Action Plan is that by the first semester of 2017, Peru will have a national proposal to recover and restore all ecosystems, which should have allocated budgets and responsibilities assigned across all government levels. Peru also plans to implement activities, such as the Forest Investment Program, in order to incentivise the value of forest ecosystems as well as the reduction of deforestation and forest degradation, by the second semester of 2016. This activity is related to Peru's stated objective of valuation of ecosystem services by 2021.

India's [National Biodiversity Action Plan](#) (NBAP) was released in 2008 and updated in 2014 with new targets and plans, in alignment with the CBD's Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets. Many of India's NBAP targets align with FLR objectives, including:

- **Target 5:** Promote site-specific eco-development programmes in fringe areas of protected areas (PAs), to restore livelihoods and access to forest produce by local communities, owing to access restrictions in PAs.
- **Target 16:** Formulate and implement partnerships for enhancement of wildlife habitat in Conservation Reserves and Community Reserves, on the lines of multi-stakeholder partnerships for afforestation, to derive both environmental and eco-tourism benefits.
- **Target 50:** Promote reclamation of wasteland and degraded forest land through formulation and adoption of multi-stakeholder partnerships involving the land owning agency, local communities, and investors.
- **Target 53:** Incorporate a special component in afforestation programmes for afforestation on the banks and catchments of rivers and reservoirs to prevent soil erosion and improve green cover.
- **Target 56:** Mainstream the sustainable management of mangroves into the forestry sector regulatory regime so as to ensure the protection of coastal belts and conservation of flora and fauna in those areas.
- **Target 66:** Promote restorative measures of degraded ecosystems using preferably locally adapted native species for this purpose.

Assessment of restoration opportunities and the relevant Aichi Biodiversity Targets

IUCN, together with other partners, is working with countries to identify existing restoration opportunities using the Restoration Opportunities Assessment Methodology (ROAM), developed by IUCN and World Resources Institute (WRI). ROAM provides a flexible and affordable framework for countries to rapidly identify and analyse areas that are primed for FLR and to identify specific priority areas at a national or sub-national level. These restoration assessments include the carrying-out of geospatial analyses to locate restoration opportunities, analyses and stakeholder consultations to identify appropriate restoration actions, and economic analysis of the proposed restoration actions to assess net costs and benefits of different interventions.

Numerous land use transitions are considered at the landscape level that have a connection with biodiversity benefits. This includes the ones pertaining to sustainable productive land uses such as the implementation of agroforestry systems or sustainable forest management, and identification of areas that are important for biodiversity conservation or that will improve the connectivity among high biodiversity areas (Target 11). The main focus of these assessments is to optimise the positive impact of land use transitions on key ecosystem services, including carbon sequestration (Target 15), the provision of the hydrological services water yield and sediment retention (Target 14), and nutrient retention (Target 8). Understanding the direct monetary impact of land use transitions for landholders (individual or communal), and the impact on the provision of key ecosystem services is the main output for developing restoration incentive instruments

(Target 3) and overall as input for the development of the financial strategy of the different restoration programmes (Target 20). Restoration opportunities assessments also have the potential to identify and prioritise restoration in areas that are of specific concern to threatened species and biodiversity (Target 12), to design restoration strategies that support the increase and maintenance of genetic diversity in cultivars (Target 13) and to ensure that restoration actions are not vectors for the establishment and spread of invasive alien species (Target 9). Finally, measuring the provision of ecosystem services from different land uses is one way to demonstrate the value of high biodiversity areas (Target 1).

As a result of the application of this methodology, various countries have been able to identify their restoration opportunity areas at the national or sub-national level with specific restoration activities to be implemented. Brazil, Costa Rica, Côte d'Ivoire, El Salvador, Ghana², Guatemala, Mexico, Nicaragua, and Rwanda are examples of jurisdictions that have completed ROAM assessments at the national or subnational level, which results are presented in the tables annexed to this document.

The restoration activities or FLR interventions included in the tables were identified as the most appropriate for the national situation and respond to the results of the biophysical, economic and institutional analyses and consultations/feedback from stakeholders. Furthermore, the tables show information on the Aichi Biodiversity Targets that best connect to the appropriate restoration techniques identified by the country assessments.

² Ghana has a preliminary restoration assessment that includes a restoration opportunities map and associated analyses on net economic benefits per ton of carbon sequestered.

In some countries certain restoration activities have been deemed appropriate for a specific type of current land use; however different decisions could be taken in other countries for the same type of land use. The appropriate restoration transitions are dependent upon the country context. For example, in some landscapes restoration in degraded pastures could be implemented through agroforestry or silvopastoral systems, while in others natural regeneration or plantations with native species would be more appropriate. The unifying factor is the FLR approach with the guiding principles described in the first section of this document. The manifestation of these principles through the selection of restoration strategies depends on many biophysical, socio-economic and other factors which vary from landscape to landscape.

The following examples illustrate the diverse choices of restoration activities for certain land-uses and the associated Aichi Targets.

In **Brazil** in 2009, a group of NGOs, private companies, governments, and research institutions launched one of the most ambitious ecological restoration programmes in the world – the Atlantic Forest (Mata Atlantica) Restoration Pact. The programme has more than 260 members and has a mission to restore 15 million hectares of the forest by 2050. The Pact aims to promote biodiversity conservation, job creation and income generating opportunities through the restoration supply chain, provision of key ecosystem services to millions of people as well as to establish incentives for landowners to comply with the Forest Code. The coalition plans to restore more than one million hectares of land by the Bonn Challenge's 2020 target. Espirito Santo, one of the state members of the Restoration Pact, developed a restoration opportunities assessment that found six types of current land usage – pasture, agriculture, macega (natural native vegetation in early secondary stage of regeneration), silviculture, bare soil, and mining – with a total area of restoration opportunity of 574,475 hectares. Some

appropriate restoration techniques for Brazil would be high-density forest restoration, soil restoration, and assisted natural regeneration, among other interventions. The Aichi Biodiversity Targets that were identified as being most relevant to Brazil's restoration techniques are Targets 7, 13, and 15.

In 2012, **Costa Rica** pledged to restore one million hectares toward the Bonn Challenge, and later completed a ROAM assessment. Costa Rica's restoration assessment identified an area with over three million hectares of restoration potential where activities cover ten types of current land usage, including categories such as pastures for milk and beef production, shade coffee plantations, and mature forest outside protected areas. Restoration in the selected area of one million hectares will contribute to Aichi Biodiversity Targets 5, 7, 8, 14, and 15.

In 2016, **Côte d'Ivoire** pledged to restore five million hectares in support of the Bonn Challenge. Côte d'Ivoire recognises that through FLR it is possible to reduce the negative effects of climate change in the country while creating opportunities to improve livelihoods from rural communities. In its restoration assessment, the government of Côte d'Ivoire identified 5,077,672 hectares of restoration potential, split among five categories of current land uses – protected areas, production forests, rural domains, other (including sacred groves), and abandoned mines; 87 percent of the restoration opportunity is currently held in rural lands. This assessment provided the foundation for the Bonn Challenge commitment. The restoration assessment identified a detailed list of possible restoration interventions for each type of land use, including participatory management of human habitats, land tenure security review, promotion of commodity-based agroforestry, and phytosanitary training and monitoring. Several Aichi Biodiversity Targets were identified as relevant through the implementation of restoration activities as per the assessment, such as Targets 2, 3, 4, 5, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, and 20.

El Salvador has committed one million hectares to the Bonn Challenge, and completed a full ROAM assessment after its announcement, to better specify the extent and nature of the opportunity. El Salvador's restoration assessment found five types of current land use – scrub, basic grains, mosaic crop/grass/vegetation, sugar cane cultivation, and coffee plantations. The country's restoration assessment indicated that there are 1,152,647 hectares of restoration opportunity. El Salvador plans to restore this area of opportunity through a wide range of interventions, including the establishment of gallery forest, diversified systems of fruit cultivation, and replacing coffee with cocoa crops. The restoration assessment identified links to the Aichi Biodiversity Targets 5, 7, 8, 11, 13, 14, and 15.

In 2015, **Ghana** committed 2 million hectares to the Bonn Challenge after identifying restoration opportunities across several types of land uses including degraded forests and deforested land, savannahs, wetlands, plantations, agricultural zones and abandoned mines. Restoration strategies for these types of lands have been included in a variety of initiatives, national plans, and regulations. Internationally funded initiatives such as FLEGT, FIP and Natural Resources and Environmental Governance Program (NREG) support restoration activities, while Ghana's restoration strategies include improvement of forest management systems, soil and water conservation, natural regeneration, cultivation of multipurpose trees in farms, re-introduction of native plants and animal genetic material, among others. The implementation of these FLR activities will generate benefits to biodiversity that could be linked with the Aichi Biodiversity Targets 1, 2, 5, 7, 9, 11, 13, 14, 15, 16, 17, 18, and 20.

In **Guatemala**, the National Forest Institute decided to initiate a participatory process to develop a map of FLR opportunities. The aim of the assessment was to provide a basis for the development of the country's first national-level FLR strategy and the re-shaping of existing reforestation incentive schemes to better align

with the FLR approach. This was seen as important for assisting the country in meeting its commitments under international conventions and national policies related to land use. The mapped assessment and national strategy process was also intended to provide a platform for cross-ministerial engagement so that priorities related to poverty reduction, food security and mitigation, for example, can be addressed in a complementary way with those related to forests and other land uses. The completed assessment identified three basic types of land use in Guatemala – low shrubbery, natural pastures, and basic grains – with a total area of opportunity for restoration of 1,757,409 hectares, from which an area of 1,230,755 hectares was prioritised and pledged under the Bonn Challenge. The appropriate restoration techniques identified were natural regeneration, forestry plantations, agroforestry systems with permanent crops, and silvopastoral systems, which connect to Aichi Biodiversity Targets 5, 7, 11, 14, and 15.

In **Mexico**, the aim of the assessment was to contribute to the development of a cross-institutional national FLR strategy with a focus on the states of the Yucatan Peninsula. This assessment produced a national-level map of priority areas for FLR, which is being used by federal institutions to prioritise actions in support of national objectives, and to formulate the national FLR strategy and strengthen existing policy instruments on forest restoration. The restoration assessment identified six types of land use in the Yucatan Peninsula – protected areas (IUCN category I to IV) and primary vegetation; protected areas (IUCN category VI); secondary vegetation (trees); secondary vegetation (shrubs and grasslands); agriculture and livestock grazing. The total area of restoration opportunity identified in the Yucatan Peninsula is 3,764,400 hectares. A wide range of appropriate restoration techniques were identified, ranging from ecological restoration to improved shifting cultivation, to commercial forest plantations. The Aichi Biodiversity Targets relevant to Mexico's FLR work in the Yucatan Peninsula include Targets 5, 7, 8, 11, 14, and 15.

In 2015, **Nicaragua** committed to restore 2.7 million hectares through the Bonn Challenge. Since then, Nicaragua has completed a ROAM assessment for the north Caribbean coast region, and identified six categories of current land usage – natural grass savannah, scrub, shrubby and herbaceous vegetation, broadleaf forest restoration, annual crops and pastures. Within the north Caribbean coast region 1,203,052 hectares with potential for restoration have been identified. Some appropriate restoration techniques that were identified in the assessment include pine reforestation, recovery of perennial traditional crops, natural and induced regeneration, and agroforestry. The Aichi Biodiversity Targets that are most relevant to restoration in Nicaragua include Targets 5, 7, 11, 13, 14, and 15.

In **Rwanda**, the initial impetus for a restoration assessment came from the ambitious commitment, announced by the Government of Rwanda in 2011, to implement FLR countrywide by 2035. The main aim of the assessment was

therefore to guide the scaling up of Rwanda's restoration efforts. In its ROAM assessment, the government of Rwanda identified five types of land use – protected areas and primary vegetation, secondary vegetation (trees), protective forests, agriculture, and livestock grazing. In total, the ROAM assessment found 1,534,430 hectares of restoration opportunity around the country, with effects and benefits extending to more than two million hectares, and identified restoration interventions for each type of land use, ranging from natural regeneration (Aichi Biodiversity Targets 5, 11, 14, 15) to secondary forest enrichment for sustainable use (Targets 5, 11, 14, 15), to agroforestry (Targets 5, 7, 8, 15). The Aichi Biodiversity Targets that best connect to Rwanda's restoration techniques are Targets 5, 7, 8, 11, 14, and 15. Rwanda made a pledge to the Bonn Challenge to restore two million hectares by 2020.

For more details on these country restoration assessments, please see Annex.

Mainstreaming biodiversity for wellbeing through forest landscape restoration

For nearly two decades, the CBD has set biodiversity targets that have had success in creating institutional space for the monitoring and assessment of biodiversity at a national and international scale. The theme of the 13th Conference of the Parties, held in Cancun, Mexico is *Mainstreaming biodiversity for wellbeing*, and is intended to expand the discourse on biodiversity by integrating it with other sectors. A significant amount of effort has been given to communicating the importance of biodiversity to policy-makers since the inception of the 2010 Aichi Biodiversity Targets. Ecosystem services are a good example of how biodiversity can be communicated and mainstreamed. Prior to their emergence as a concept it was difficult to quantify some of the economic and social benefits provided to people by biodiversity. This is especially the case for non-provisioning services such as disaster risk reduction, carbon sequestration, and cultural services. Since the economics of ecosystems and biodiversity studies and the integration of their results into the monitoring of the 2010 Biodiversity Targets, the externalities of biodiversity services for social and economic enterprises are far greater integrated in decision-making and cost accounting.

However, ecosystem services themselves do not always capture the full contribution of biodiversity to the concept of wellbeing. They can be good indicators, but wellbeing through biodiversity restoration and conservation is a topic that should also include the socio-economic linkages to species and ecosystems, and increasingly include broader social benefits as well. As a concept, and in practice, FLR is grounded by its focus on restoring the productivity of degraded

landscapes for both people and nature. In practice, FLR is primarily focused on restoring degraded lands to support human livelihoods and the benefits of these restoration strategies are often positive for biodiversity.

A central challenge to the mainstreaming of biodiversity for wellbeing is the common institutional disconnect between organisations that work on “development” and organisations that work to support biodiversity. The interdisciplinary nature of FLR has precipitated a weakening of these institutional barriers in areas where it is implemented such that, for example, coffee farmers and ranchers in Costa Rica are planning FLR activities to both restore degraded lands and increase their productivity – which directly supports national economic growth and biodiversity conservation. Similarly, in Malawi, FLR has the potential to contribute 4.5 million hectares of restored landscapes under the Bonn Challenge that will help support their Vision 2020 national development strategy – a strategy that is heavily dependent on using natural and human resources to meet economic development goals.

In an international development context, FLR could be the emerging nature-based solution for addressing biodiversity conservation, climate change adaptation and mitigation, poverty alleviation, and economic growth objectives, effectively and coherently. With nearly 125 million hectares of land area currently contributed to the Bonn Challenge, and an expected 350 million hectares under restoration by 2030, the degraded landscapes of the world will begin to transform into more productive assets that will be better able to support increased human wellbeing.

Conclusion

This document illustrates how Parties to the CBD are already planning and implementing actions to restore forest biodiversity, ecosystems and landscapes – at both the national and jurisdictional levels – that directly and indirectly contribute to the achievement of the Aichi Biodiversity Targets. Aligning these efforts with the FLR approach and the Bonn Challenge provides a pathway through which national contributions to biodiversity conservation and restoration can be quantified.

In some cases, just the presence of the information generated through an FLR assessment would be useful for an NBSAP and vice versa. In some cases these contributions are not yet fully integrated into NBSAPs, national reports or ongoing national CBD processes. The exploration of how the objectives of FLR and of the CBD align presented in this report is therefore expected to improve the outlook for national action in support of the achievement of several Aichi Biodiversity Targets.

References

- Convention on Biological Diversity. "Article 10. Sustainable Use of Components of Biological Diversity." <https://www.cbd.int/convention/articles/default.shtml?a=cbd-10>
- Convention on Biological Diversity. "Article 6. General Measures for Conservation and Sustainable Use." <https://www.cbd.int/convention/articles/default.shtml?a=cbd-06>
- Convention on Biological Diversity. "COP 10 Decision X/36." <http://https://www.cbd.int/decision/cop/default.shtml?id=12302>
- Convention on Biological Diversity. "COP 5 Decision V/4." <https://www.cbd.int/decision/cop/default.shtml?id=7146>
- Convention on Biological Diversity. "COP 6 Decision VI/22." <http://https://www.cbd.int/decision/cop/default.shtml?id=7196>
- Convention on Biological Diversity. "COP 9 Decision IX/5." <http://https://www.cbd.int/decision/cop/default.shtml?id=11648>
- Convention on Biological Diversity. "Decision adopted by the Conference of the Parties to the Convention on Biological Diversity at its Eleventh Meeting." <https://www.cbd.int/doc/decisions/cop-11/cop-11-dec-16-en.pdf>
- Convention on Biological Diversity. "Forest Ecosystem Restoration Initiative." <https://www.cbd.int/doc/meetings/cop/cop-12/information/cop-12-inf-19-en.pdf>
- Convention on Biological Diversity. "Forest Resilience, Biodiversity, and Climate Change." <http://https://www.cbd.int/doc/publications/cbd-ts-43-en.pdf>
- Convention on Biological Diversity. "History of the Convention." <http://https://www.cbd.int/history/>
- Convention on Biological Diversity. "Mainstreaming Biodiversity Issues into Forestry and Agriculture." <https://www.cbd.int/doc/publications/cbd-ts-34-en.pdf>
- Convention on Biological Diversity. "Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets." <https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf>
- Convention on Biological Diversity. "What's the Problem?" <https://www.cbd.int/forest/problem.shtml>
- Convention on Biological Diversity. Republic of Colombia. "National Policy for the Integral Management of Biodiversity and its Ecosystemic Services (NPIMBES)." <https://www.cbd.int/doc/world/co/co-nbsap-v2-en.pdf>
- Convention on Biological Diversity. Republic of India. "National Biodiversity Action Plan (NBAP)." <https://www.cbd.int/doc/world/in/in-nbsap-v3-en.pdf>
- Convention on Biological Diversity. Republic of Peru. "Estrategia Nacional de Diversidad Biológica" (in Spanish). <https://www.cbd.int/doc/world/pe/pe-nbsap-v2-es.pdf>
- The Global Partnership on Forest and Landscape Restoration. "A World of Opportunity." http://www.forestlandscaperestoration.org/sites/default/files/resource/4_bonn_challenge_world_of_opportunity_brochure_2011-09.pdf
- IUCN and WRI (2014). A guide to the Restoration Opportunities Assessment Methodology (ROAM): Assessing forest landscape restoration opportunities at the national or sub-national level. Gland, Switzerland: IUCN <https://portals.iucn.org/library/sites/library/files/documents/2014-030.pdf>
- Sayer, J. et al. 2013. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. http://www.forestlandscaperestoration.org/sites/default/files/resource/sayer_et_al_2013.pdf

Annex: Synthesis tables of restoration opportunities assessments and relevant Aichi Biodiversity Targets

Brazil - Espirito Santo State

Current Usage ⁵	Area of Opportunity (ha)	Percentage	Appropriate Restoration Techniques	Aichi Target
Pasture	303.175	61,3%	High diversity forest restoration; Agroforestry; Silvopastoral system	15
Agriculture	181.840	20,6%	High diversity forest restoration; Agroforestry	7, 13, 15
<i>Macega</i> **	52.146	10,5%	Assisted natural regeneration; Forest enrichment	13, 15
Silviculture	30.511	6,2%	Assisted natural regeneration; Forest enrichment	7, 13, 15
Bare soil	5.833	1,2%	Soil restoration; High diversity forest restoration	15
Mining	970	0,2%	Soil restoration; High diversity forest restoration	15
TOTAL	1'543,505			

³ Land use located on Permanent Preserved Area, whose restoration is required according to the Forest Code (Lei 12.651/2012); **Native vegetation in early secondary stage of regeneration.

Costa Rica

Current Usage	Area of Opportunity (ha)	Area to restore (ha)	Percentage	Appropriate Restoration Techniques	Aichi Target
Pastures below 1600 masl (beef production) and pastures above 1600 masl (milk production)	1,069,527	100,000	9,3%	Silvopastures	7, 14, 15
Pastures below 1600 masl (beef production)		255,000	23,8%	Improved pastures	7, 14, 15
Pastures below 1600 masl (beef production)		100,000	9,3%	Enrichment and passive regeneration on abandoned pastures ⁴	7, 14, 15
Pastures for beef and milk production (outside of Livestock NAMA)	650,000	70,000	10,76%	Reforestation, implementation of plantations for timber production	5, 7, 14, 15
Shade coffee (around 90% of area including 500/600 has of organic coffee)	83,633	22,500	27%	Fertilizer management, use of slow release fertilizers to reduce P and N loading	7, 8, 14, 15
Sun coffee (around 10% of area, mainly in Central Valley, the capital area)		2,500	3%	Agroforestry system and fertilizer management, planting trees and use of slow release fertilizer	7, 8, 14, 15
Pineapple, banana and oil palm	147,971	25,000	17%	Tree planting in contour areas to decrease erosion and incorporation of crop residues into the soil, fertilizer management and restoration of riparian forest	7, 8, 14, 15
Secondary forest outside protected areas	400,000	125,000	31,25%	Management of secondary forest in areas with forecasted risk of deforestation	5, 7, 11, 14, 15
Mature forest outside protected areas (can be deciduous, low and premontane, or montane forest)	800,000	150,000	18,75%	Management of mature forest in areas with forecasted risk of deforestation	5, 7, 11, 14, 15
Mature forest outside protected areas		150,000	18,75%	Increase of area under conservation PSA	5, 7, 11, 14, 15
TOTAL	3,151,131	1,00,000	31,7%		

⁴ Intensification on improved pastures creates pasture abandonment.

Côte d'Ivoire

Current Usage	Minimum Restoration Opportunity (ha)	Proportion of Total restoration Opportunity (%)	Proposed, appropriate Restoration Techniques	Aichi Target
Protected Areas – Parks, Natural forest and Reserves: - Parks and Reserves - Mangroves - Gallery forests - Wetlands	97, 943	2%	- Participatory management of human habitats - Management of invasive Species - Effective Protection, monitoring & control strategies - Development of legal guidelines and texts - Assisted natural regeneration	2, 5, 9, 12, 14, 15, 16, 17, 18, 19, 20
Production Forests	556, 298	11%	- Revue of Participatory Management plans : - Land tenure security revue - Encroachment Management - Managing human settlements and agricultural fields ; - Surveillance against bush fires & illegal exploitation - Reforestation	2, 4, 5, 14, 15,
Rural Domains: - Agro-forestry mosaics - Private plantations - Savannahs & Secondary forests	4, 423, 431	87%	- Promotion of cocoa coffee, cashew, rubber certification - Promotion of commodity-based Agroforestry - Phytosanitary training and monitoring - Rain and Water harvesting techniques, e.g., bunding irrigation, bore holes, etc - Orchards rejuvenation strategy, - Secondary forest protection against bushfires, assisted natural regeneration - Tenure Laws application	2, 3, 4, 5, 7, 13, 14, 15, 17, 18, 20
Others: - Sacred groves - Abandoned mines	Dispersed across Protected areas, Production forests and Rural domains	N/A	- Support by-laws - Build management capacity - Establishment of tenure certificates - Assisted natural regeneration - Creation of fast-growing tree plantations mixed tree plantations as first vegetation cover succession to create conditions for assisted natural regeneration of slow-growing native species, and recolonisation - Implement regulations for artisanal mining and control of forest fires - Detoxification	2, 3, 4, 5, 8, 9, 12, 15, 17, 18, 20
TOTAL	5,077,672	100%		

El Salvador

Current Usage	Area of Opportunity (ha)	Area to restore (ha)	Percentage	Appropriate Restoration Techniques	Aichi Target
Scrub	99,689	20,000	20%	Establishment of gallery forest	5, 11, 14, 15
Basic grains	571,080	218,500	38,26%	agroforestry system in basic grains	7, 13, 14, 15
Mosaic crop, grass and vegetation	254,826	31,000	12,16%	diversified system of fruit	7, 13, 14, 15
		51,000	20%	Intensive silvopastoral svstem	7, 14, 15
		100,000	39,24%	Forest silvopastoral system (timber / fruit)	7, 14, 15
		31,000	12,16%	diversified cocoa agroforestry system	7, 14, 15
Sugar cane	94,052	20,000	21,26%	Adoption GAP ⁵ margins river, parks, reserves. Establishment of a strip of green harvest to the margins of protected areas	7, 8, 11, 14, 15
Coffee	133,000	113,000	85%	Coffee plants renovation and introduction of timber species	14, 15
		20,000	15%	Replacing coffee with cocoa crops (lower heights of 900 m.s.n.m. as an adaptation measure to climate change)	14, 15
TOTAL	1,152,647³	606,000	52,6%		

⁵ GAP: Good agricultural practices

⁶ The total opportunity area identified in El Salvador is 1,253,077 ha., however, the remaining 100,000 ha. are distributed in very different land uses and small sized, so they were not used to perform the following analysis set out in ROAM.

Ghana

Ecological Zones/Land Use Land Cover (Land use classification - GEF-NPFE Ghana, 2011; CBD fifth National report, Ghana, 2015)	Degradation drivers/dimensions/ responses	Consequences	Ongoing & Proposed, Restoration Techniques &/or land use transitions	Corresponding CBD/Aichi Biodiversity Targets
<p>Forests:</p> <ul style="list-style-type: none"> - High forests - Forest / Savannah transition - Semi deciduous forests - Degraded forests - Gallery forests - Sacred groves 	<p>Land-use conversions (from cocoa to rubber cocoa to galamsey – illegal small scale mining, forest to cocoa etc); habitat loss, Forest industry over-capacity, policy/market failures in the timber sector; population pressure; wild fires; Unsustainable agricultural practices particularly cash crops;</p>	<p>High demand for agricultural, wood and other forest products; predation; misapplication of chemicals; Invasive alien species, leading to declining species numbers, composition, density, dispersion and distribution; Declines in housing materials; local displacement of species and scarcity of water sources; Pollution of water bodies leading to decline in fish species; silt of water sources reducing volumes of water these systems can carry;</p>	<p>- Forest Law Enforcement, Governance and Trade (FLEGT) Initiative;</p> <ul style="list-style-type: none"> - Natural Resources and Environmental Governance Program (NREG); - Community-based Natural Resources Management; - Tenure Security - REDD+, FIP and Safeguards; Mainstreaming Biodiversity - Conservation and Utilization - Ecosystem approach - pollinator conservation and biology & Livestock Park system; - Traditional Protected Areas Management System (Sacred Groves) - Natural Regeneration - Cultivation of Multipurpose trees in admitted farms - Plantations in degraded forest reserves 	<p>1, 2, 4, 5, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20</p>
<p>Savannahs:</p> <ul style="list-style-type: none"> - Sudano sahelial - Guinea Savannah - Coastal savannah 	<p>Wild fires, large and small scale agriculture, Dependence on charcoal and wood fuel; reliance on cyclical 'slash and burn'</p>	<p>More intensive fuel Wood harvesting; Invasive alien species; Declining grazing lands, farmlands and productivity; local displacement of species and scarcity of water sources;</p>	<p>- Strengthening the NREG; REDD+, FIP and safeguards</p> <ul style="list-style-type: none"> - Tenure Security; - Fire protection sensitization - Re-introduction of plant 	<p>1, 2, 5, 7, 9, 11, 13, 14, 15, 16, 17, 18, 20</p>

Ghana continued

	<p>farming; loss of habitats, decline in species populations, local species extinctions,</p>	<p>declines in soil fertility; desertification; floods and droughts; disruption of social structure (emigration); increasing vulnerability</p>	<p>and animal genetic material; -Mainstreaming Biodiversity Conservation and Utilization; -Afforestation; -Soil and water conservation measures - Natural regeneration under controlled fire and grazing - Woodlots for sustainable woodfuel production -Plantations</p>	
<p>Agriculture Zones</p> <ul style="list-style-type: none"> - Rain fed - Irrigated - Tree crops 	<p>Human pressure on land; Inappropriate use of agricultural chemicals, Monoculture plantation development; Limited technology development in farming systems; reliance on cyclical 'slash and burn' farming</p>	<p>Declining agri-biodiversity; Invasive alien species; Reduced connectivity between agricultural and forest landscapes</p>	<p>-Re-introduction of plant and animal genetic material; -Mainstreaming and scaling-up sustainable land management practices; -Soil and water conservation Measures Climate Smart Agriculture agroforestry.</p>	<p>1, 2, 3, 4, 7, 8, 13, 16, 18, 20</p>
<p>Wetlands;</p> <ul style="list-style-type: none"> - Flood plains - Mangroves 	<p>Large and small scale agriculture, excessive fuel wood harvesting; excessive fishing; loss of fishing grounds; over exploitation of wetlands resources</p>	<p>Habitat loss and modification, species loss and extinctions; loss of fish resources</p>	<p>-Strengthening the NREG; -Knowledge base management and restoration</p>	<p>1, 2, 5, 6, 10, 11, 12, 14, 15, 17, 19, 20</p>
<p>Plantations:</p> <ul style="list-style-type: none"> -Timber & Tree crop plantations <p>Others:</p> <ul style="list-style-type: none"> -Abandoned mines 	<p>Monoculture plantation development</p> <p>Soil poisoning, invasive alien species</p>	<p>Genetic erosion, species vulnerabilities</p> <p>Land unproductivity, loss of water quality and livelihoods</p>	<p>-Tree-crop certification systems to promote diversification Enrichment planting with multi-purpose trees -Strengthening the NREG; -Application of Strategic Environmental Assessment (SEA)</p>	<p>1, 2, 3, 4, 7, 13, 15, 1, 4, 8, 9, 15, 18,</p>

Guatemala

Current Usage	Area of Opportunity (ha)	Area to restore (ha)	Percentage	Appropriate Restoration Techniques	Aichi Target
Low shrubbery (Shrubs and guamiles)	839,049	47,626	5,67%	Natural regeneration for forest protection	5, 11, 14, 15
		102,488	12,2%	Natural regeneration for forest protection in protected areas	5, 11, 14, 15
		399,936	47,66%	Productive forest through forestry plantations	5, 7, 14, 15
		236,718	28,2%	Agroforestry systems with permanent crops	7, 14, 15
Natural pastures	364,828	62,748	17,2%	Natural regeneration for forest protection in protected areas	5, 11, 14, 15
		44,627	12,2%	Agroforestry systems with permanent crops	7, 14, 15
		68,751	18,8%	Agroforestry systems with annual crops	7, 14, 15
		79,663	21,8%	Silvopastoral systems	7, 14, 15
Basic grains	553,532	159,961	28,9%	Agroforestry systems	7, 14, 15
TOTAL	1,757,409	1,230,755	70%		

Mexico - Yucatan Peninsula

Current Usage	Area of Opportunity (ha)	Percentage of area under current land use	Appropriate Restoration Techniques	Aichi Target
Protected areas (IUCN category I to IV) and primary vegetation	56,149	1.7%	Ecological restoration	5, 11, 14, 15
Protected areas (IUCN category VI)	68,486	7.4%	Ecological restoration (32,610), Secondary forest enrichment for sustainable use (35,876)	5, 11, 14, 15
Secondary vegetation (trees)	1,225,670	20.3%	Secondary forest enrichment for sustainable use	5, 11, 14, 15
Secondary vegetation (shrubs and grasslands)	563,926	53.7%	Secondary forest enrichment for sustainable use (143,733), Improved traditional shifting (milpa) cultivation (420,193)	5, 7, 11, 14, 15
Agriculture	537,623	76.3%	Improved traditional shifting (milpa) cultivation (386,388), Agroforestry (116,641), Agropastoral systems (34,594)	5, 7, 8, 15
Livestock grazing	1,312,546	89.4%	Silvopastoral systems (1,073,489), Commercial forest plantations (239,057)	5, 7, 15
TOTAL	3,764,000			

Nicaragua

Current Usage	Area of Opportunity (ha)	Area to restore (ha)	Percentage	Appropriate Restoration Techniques	Aichi Target
Natural grass savannah	271,761	29,506	11%	Pine reforestation (Pine as native species), recovery of perennial traditional crops	5, 7, 11, 13, 14, 15
Scrub	253,829	20,709	8%	Natural and induced regeneration	5, 7, 11, 14, 15
Shrubby and herbaceous vegetation	171,113	13,961	8%	Natural and induced regeneration	5, 7, 11, 14, 15
Broadleaf forest regeneration	65,324	5,330	8%	Natural and induced regeneration	5, 7, 11, 14, 15
Annual crops	8,396	5,082	61%	Adoption GAP and agroforestry system	7, 11, 14, 15
Pastures	432,629	25,412	6%	Silvopastoral systems with fodder trees. technological changes and management techniques and stabling to reduce the area of livestock	7, 11, 14, 15
TOTAL	1,203,052	100,000⁴	8,3%		

⁷ Commitment established in ERPIN document

Rwanda

Current Usage	Area of Opportunity (ha)	Percentage of area under current land use	Appropriate Restoration Techniques	Aichi Target
Protected areas (IUCN category I to IV) and primary vegetation	13,933	1%	Natural Regeneration Ecological restoration	5, 11, 14, 15
Secondary vegetation (trees)	255,930	22.3%	Secondary forest enrichment for sustainable use	5, 11, 14, 15
Protective Forest	128,191	5 %	A mixture of plantation of forest on critical catchment, rivers, roads	5, 11, 14, 15
Agriculture	1,111,476	45%	Agroforestry on steeply sloping and flat (706,162ha) and gently sloping land slopes (405,314),	5, 7, 8, 15
Livestock grazing	24,900	0.4%	Silvopastoral systems (24900),	5, 7, 15
TOTAL	1'534,430			



INTERNATIONAL UNION
FOR CONSERVATION OF NATURE

WORLD HEADQUARTERS
Rue Mauverney 28
1196 Gland, Switzerland
Tel: +41 22 999 0000
Fax: +41 22 999 0002
www.iucn.org

