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# av45

## FOREST LANDSCAPE RESTORATION
### POTENTIAL AND IMPACTS

**IN THIS ISSUE: HORST FREIBERG** REPORTS ON THE PHENOMENAL RESPONSE TO THE BONN CHALLENGE **JOHN D. LIU** IGNITES HIS PASSION FOR COMMUNICATING A 'RESTORATIVE' NARRATIVE **BIANCA JAGGER** TALKS ABOUT WHAT FOREST RESTORATION MEANS TO HER

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# av45

**Arborvitae returns!**
Regular readers will have noticed that it's been some time since the last issue of **arborvitae** appeared, in October 2011. The **arborvitae** team is pleased to announce that this new-look issue marks the relaunch of the magazine. Future issues are already being planned, focusing on issues such as pro-poor REDD+, forests in China, and climate change adaptation.

**Free poster**
Included with hardcopies of this issue of **arborvitae** is a free poster that summarizes the methodological framework developed for assessing FLR potential at a national or sub-national level. The poster can also be downloaded at www.iucn.org/forest and further hardcopies of the poster can be requested by writing to: gpflr@iucn.org

This **arborvitae** is also available in French and Spanish on our website at www.iucn.org/forest/av

If you have a comment on something you have read in a recent issue of **arborvitae**, we'd love to hear from you. You can send a message to: jennifer.rietbergen@wanadoo.fr

# Editorial

An idea whose time has come. That's the least we can say about how forest landscape restoration (FLR) has leapt up the international policy agenda and gained global public support over the last couple of years. Things have certainly been moving fast since the Bonn Challenge – to restore 150 million hectares of degraded and deforested land by 2020 – was launched in September 2011. The Challenge, facilitated by IUCN and the German government as an implementation vehicle for the three Rio conventions (and specifically CBD Aichi Target 15 and the REDD+ provisions under the UNFCCC), proved to be a watershed moment as high-level representatives of governments, businesses and conservation groups called for bold commitments on FLR around the world. The response so far has been very encouraging: one-third of the ambitious target is already within reach and there is now widespread recognition that the world's largest restoration initiative has truly taken off. Equally encouraging is the fact that, in a poll of over one million global citizens ahead of the Rio+20 talks in June 2012, the Bonn Challenge was voted the most important forest issue upon which heads of state should act, and second overall after sustainable energy. The Plant a Pledge campaign, launched by IUCN and Airbus shortly before Rio+20, helped stimulate and maintain this momentum as thousands of people are pledging their support for the Bonn Challenge and urging governments to act.

We shouldn't forget though that FLR has not been an overnight sensation. The buzz it is creating now has come after a decade's hard slog by proponents and researchers to convince policy-makers that forest landscape restoration is an idea worth backing. The somewhat reticent response they initially received can be explained in part by what were two widely-held myths about FLR: that it is too costly and takes too much time. Investing in FLR was seen as a less attractive, less urgent task compared to the fight against deforestation. Now, thanks to a strong portfolio of evidence to help dispel those myths, and growing public awareness that the damage done by deforestation needs to be reversed, there has been a real mindset change and FLR has become firmly established as a global conservation priority.

This evolution has allowed time to construct a solid, evidence-based case for FLR and given space for a rich diversity of restoration approaches to be tried and tested. We have also had the opportunity to develop consensus within the international forestry community on the general principles and parameters of FLR and build powerful partnerships with public and private sector actors and local communities.

Looking forward now, we are in a strong position to help ensure that FLR fulfils its potential as a means of boosting local livelihoods, ecosystem health, and our capacity to slow down and adapt to climate change. We are already working with countries, organizations and communities to translate Bonn Challenge commitments successfully into action – this will be the real challenge for the future. We share the same three top priorities for restoration as Braulio Ferreira de Souza Dias, the Executive Secretary of the CBD, who recently listed them as: "implementation, implementation, and implementation."

*Stewart Maginnis,*
*Global Director, Nature-based Solutions*
*Group, IUCN*

# Contents

# Global FLR potential:
## the big picture

**Tim Rollinson,** co-Chair of the Global Partnership on Forest Landscape Restoration, gives a world tour of forest landscape restoration potential.
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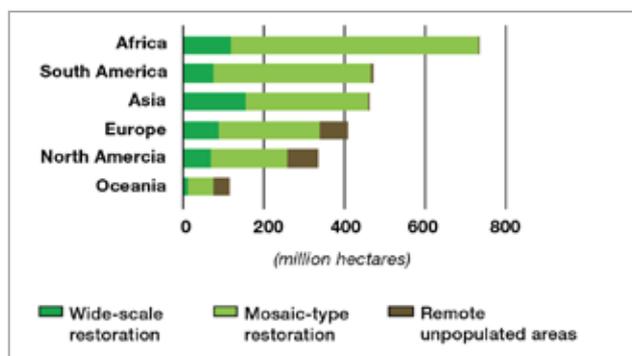


**Source: Minnemeyer et al., 2011.**

**Africa has the greatest land area with forest landscape restoration opportunities**

How much degraded and deforested land is available for restoration on a global level? Where are the major opportunities for restoration? What types of restoration will be suitable for these areas? These are the questions that we in the Global Partnership on Forest Landscape Restoration (GPFLR) have been tackling over the past two years. In 2011 we commissioned an analysis of the global potential for forest landscape restoration. The study, undertaken by IUCN, WRI and the University of Maryland, has shown that there are more than two billion hectares of land around the world today that would benefit from restoration. This is more than double the size of the US or China.

Of this vast area, approximately one and a half billion hectares would be best suited for mosaic restoration, i.e. restoration in which forests and trees are combined with other land uses, including agroforestry, smallholder agriculture, and settlements. Up to about half a billion hectares would be suitable for wide-scale restoration of closed forests. In addition to these two billion hectares, there are 200 million hectares of unpopulated lands, mainly in the far northern boreal forests, that have been degraded by fire but would be difficult to restore due to their remoteness.

Aside from these 2,200,000,000 hectares, there is a further one billion hectares of cropland and densely populated rural areas on former forest lands. They do not offer extensive restoration opportunities in terms of area, but some of these lands would benefit from having trees planted in strategic places to protect and enhance agricultural productivity and other ecosystem functions.

Why, might you ask, are we looking at forest landscape restoration potential on such a large scale? The answer is simply because there is an urgent need to massively scale up current restoration efforts. The growing demand for forest products and the need for better food security and socio-economic opportunities among forest communities, all underline the need for forest landscape restoration. Meeting these needs while also increasing carbon stocks, improving adaptive capacity and addressing the decline in biodiversity cannot be achieved solely by efforts to slow down or even halt deforestation. These efforts are critically important of course but need to be supplemented by widespread restoration.

The global FLR opportunities map we produced (see page 15) suggests that most countries have significant opportunities to restore their forests and landscapes. But the global map also has serious limitations. It is not detailed or multi-facetted enough to guide operational national policies. While it points to countries and regions with significant restoration opportunities, a closer examination at the national level is needed before any decisions about restoration can be made. The GPFLR has therefore initiated work on the next step – assessing restoration opportunities at the national and regional levels. Pilot assessments have already been carried out in Mexico, Ghana and Rwanda and a framework method and handbook have been developed to help restoration decision-makers and practitioners conduct their own national-level assessments. This work, which is being supported by the German government's International Climate Initiative, is discussed in the following pages of **arborvitae**. The next challenge will be to roll out these national assessments and work with countries to move from assessment to implementation.

I am confident that we will see large gains in areas of restored land over the next decades. The Bonn Challenge and the very encouraging response to the Plant a Pledge campaign, both highlighted in this issue of **arborvitae**, are clear signs that FLR has come of age. Governments around the world, as well as the private sector and the general public, are more than ever convinced about the need for – and the benefits of – forest landscape restoration. We now need to keep up this momentum and carefully track the restoration initiatives underway to ensure they are carried out in the most appropriate way in each case.

**Contact:** Visit www.forestlandscaperestoration.org for more information on the global and regional assessments.

Minnemeyer, S., Laestadius, L., Sizer, N., Saint-Laurent, C. and Potapov, P. (2011). A World of Opportunity. The Global Partnership on Forest Landscape Restoration, World Resources Institute, South Dakota State University and IUCN.
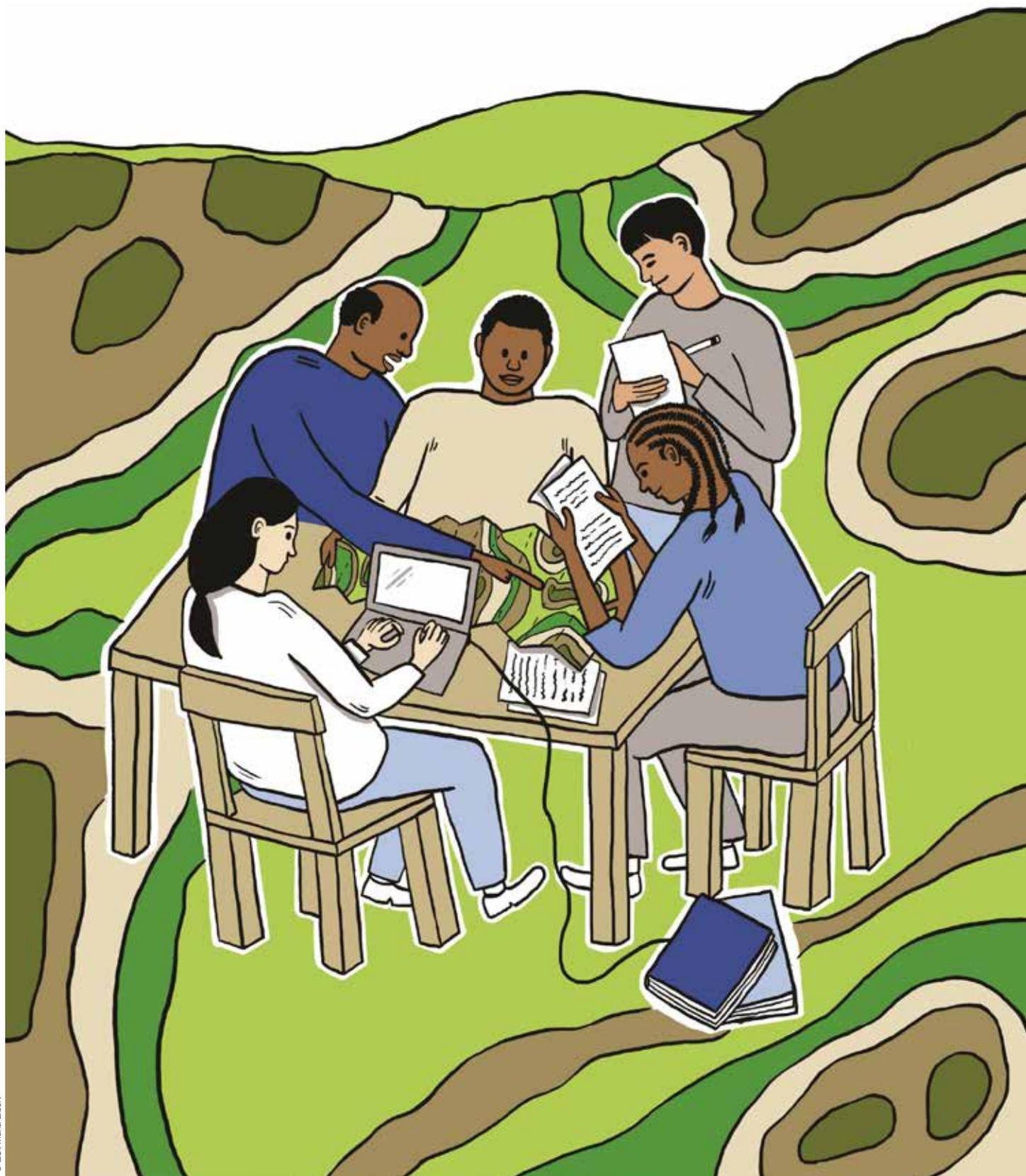
# Framing a methodology

**Carole Saint-Laurent**, Coordinator of the Global Partnership on Forest Landscape Restoration and co-Deputy Director of IUCN's Global Forest and Climate Change Programme, introduces a new methodology for assessing national or sub-national FLR potential.

With the global assessment of FLR potential now complete (see page 3), IUCN along with WRI and other partners has turned its attention to national-level assessments. We have been developing and testing a new national-level Restoration Opportunities Assessment Methodology (ROAM), based on recent field experiences in Ghana, Mexico and Rwanda. Financial support has been provided by the German Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU) for the development and dissemination of ROAM, the Program on Forests (PROFOR) for the Ghana assessment, and the UK Government's Department for International Development (DfID) and the Norwegian Agency for Development Cooperation (NORAD) for the subsequent development and application of ROAM and related tools.

The purpose of ROAM is to enable the identification, prioritization and mapping of landscape restoration opportunities and analysis of the implications associated with implementing these opportunities. ROAM is also designed to facilitate the engagement of decision-makers, experts, and other stakeholders in the assessment process, empowering them to make decisions about land use and the role of restoration in landscapes. While ROAM is not intended to be used for operational planning of restoration interventions, it can provide valuable information to help support any future restoration policies, strategies or planning exercises.

We have just produced a handbook based on this methodology, as a contribution to the Global Partnership on Forest Landscape Restoration (GPFLR), to help forestry and land-use planning decision-makers and their technical staff undertake national FLR assessments. This handbook – and the methodology behind it – are living instruments that will be regularly refined and updated based on further field testing in a number of countries. Guatemala has already followed the Mexico example and completed a national assessment of FLR potential, and there are plans for several more country-level assessments in the coming years.

ROAM can be used to help answer questions such as:

- Where are the opportunities for restoration in the country?
- Which types of intervention would be the most appropriate in different parts of the country?
- What benefits would result from restoration, for whom, and why?
- Which stakeholder groups should be involved in any restoration activities?
- What is the potential contribution of forest landscape restoration to achieving a country's climate change mitigation and adaptation and other national development objectives?
- What policy, financial and social incentives exist or are needed to support restoration?

ROAM has been designed to be adaptable to fit the level of data availability for the country in question, the resources available for the assessment and the specific objectives of the work. Thus, for example, the three pilot assessments undertaken so far were tailored to fit the differing levels of GIS data availability found in these countries. In Ghana, where such spatial data is relatively scarce, the assessment relied heavily on the knowledge of national and local stakeholders; in Mexico, where there is a wealth of GIS data, the assessment was based on an overlayering of these digital datasets; and in Rwanda, which represents an intermediate case in terms of data availability, the assessment used a combination of pre-existing and stakeholder-generated information. The overall principle of the method – to employ a combination of 'best science' and 'best knowledge' – guided all three pilots.

ROAM doesn't focus solely on a country's deforested and degraded lands; it also looks at how restoration can benefit other areas such as croplands (whether under permanent management or shifting cultivation) and land that is either susceptible to, or critical in safeguarding against, climatic or other hazards. All broad categories of restoration are considered (planted forests, natural regeneration, silviculture, agroforestry, improved fallow and protective area restoration) and a set of locally-appropriate restoration interventions is defined and progressively refined during the assessment process. Through a participatory process the assessment team can map where these intervention opportunities would be most appropriate.

One aspect of ROAM that has evolved during the most recent assessment, in Rwanda, is the stratification process, whereby the country is sub-divided into relatively homogeneous areas (strata) for the purposes of the analysis. Working with an agreed set of restoration-relevant criteria (including socio-economic as well as physical-ecological issues), an assessment team can identify a relatively small number of strata, each with a more or less consistent set of restoration conditions. This greatly helps the identification of suitable restoration options for different parts of the country. For example, an area characterized by high population density, high fuelwood demand and steep slopes would clearly benefit from, among other options, agroforestry interventions on terraced land and the establishment of local-level woodlots.

In addition to the spatial analysis at the heart of ROAM, a series of non-spatial analyses provides important information for any future restoration strategic or planning processes. These analyses can include valuation of restoration costs and benefits, estimation of carbon benefits, analysis of finance and investment options and analysis of the enabling conditions for restoration. The handbook's guidance on this last 'enabling conditions' analysis incorporates a diagnostic method that is currently being developed by WRI. This method looks at: (1) the level of motivation among top government decision-makers to develop a national-level restoration strategy; (2) the extent to which enabling conditions (e.g. policy, financial and social) exist to support such a strategy; and (3) the degree of capacity and leadership among key stakeholders for implementing such a strategy. More detailed guidelines on this method will be provided in a separate document, to be published by WRI later this year.

IUCN, WRI and other partners will be collaborating to provide further capacity-building support for landscape restoration, to be launched over the coming months. Interested parties should contact IUCN at gpflr@iucn.org or visit the IUCN website address below.

# Assessing **FLR potential** in Mexico



Forest restoration in Mexico

**Enrique Muñoz Lopez** and **Rosa Marina Rodríguez** of Mexico's National Commission for Knowledge and Use of Biodiversity report on a recent country-wide assessment of restoration potential.

As a contribution to the Bonn Challenge – to restore 150 million hectares of forest and degraded land by 2020 – IUCN coordinated a national assessment of FLR potential in Mexico in 2012. This work also served as a pilot testing of the framework methodology for national assessments of FLR potential (see page 5). The assessment was supported by the German government's International Climate Initiative and involved Mexico's major government bodies responsible for forests, biodiversity and Protected Areas, as well as academic, civil society and donor organizations.

Essentially, the assessment consisted of selecting a set of environmental, economic and social criteria (each weighted according to their importance) and applying these criteria to construct a geographic model capable of identifying potential areas for forest restoration. Fortunately, there is a wealth of relevant geographic information available in Mexico – such as digital maps of forest zones, soils, economic pressures, potential land-use and resilience to fire – and we were able to include these data in the spatial model. After some initial processing of the maps to convert them into a standardized format and projection, we took each map and used

it to prioritize areas of FLR potential on the basis of the variable(s) shown on the map. We then overlaid the different maps, combining all the criteria, and experimented with different weighting systems before arriving at the final multi-criteria spatial assessment. We then added additional data layers by extracting information from other documents and databases, including the location of all Protected Areas in the country and those Protected Areas deemed ineffective, the location of zones of high biodiversity, and dominant patterns of land tenure. These additional layers will be extremely valuable in the planning of FLR initiatives and consideration of the likely impacts of these initiatives.

The assessment was a participatory one throughout. A multi-stakeholder workshop was held prior to the assessment to identify the agreed set of criteria and their weighting. The 48 participants at this workshop represented 13 different organizations, including government agencies, academic institutions and civil society groups. A follow-up workshop was held to present the findings, review the criteria used and start planning for a national FLR strategy for Mexico. The workshop participants validated the method and proposed

additional criteria that could be used for identifying priority FLR areas. Their suggestions included for example using more social criteria (such as an existing data set on social cohesion) and data on the existence of favourable factors for FLR (such as the presence of certified forest areas and the location of REDD+ zones).

The assessment has enabled us to estimate that Mexico has a potential area of over 300,000 km² suitable for forest landscape restoration. The assessment model also indicates that, of this surface, almost nine per cent can be considered high priority, 17 per cent medium priority and 74 per cent low priority. In total, this represents about 13 per cent of Mexico's entire land area.

This information will be used by the federal institutions that participated in the assessment, to formulate a national FLR strategy for Mexico and strengthen existing policy instruments on forest restoration. The assessment has played an important role in bringing together the different national institutions working on forestry and restoration, and this has created a promising inter-institutional platform for the planning and implementation of joint strategies of restoration.

**Contact**: Enrique Muñoz Lopez, emunoz@conabio. gob.mx; Rosa Marina Rodríguez, rrodriguez@conabio. gob.mx. The map of this national assessment of FLR potential is available at: www.conabio.gob.mx.

# Mapping Forest Restoration Potential in Ghana

**Musah Abu-Juam**, from Ghana's Ministry of Lands and Natural Resources, and **Adewale Adeleke**, from IUCN, report on the recent assessment of restoration opportunities in Ghana.

The implementation of successful REDD+ actions needs to ensure that forests are conserved, managed and restored in ways that achieve climate change mitigation targets, help secure sustainable livelihoods and maintain the provision of forest ecosystem goods and services to humankind.

As REDD+ negotiations continue to define the initiative at the international level, one key aspect that has become prominent is the need to integrate REDD activities with forest restoration activities at the landscape level. This would not only ensure a more holistic and sustainable approach to reducing emissions and optimizing benefits, but would also contribute to the efficient use of rather scarce resources.

Ghana's forest cover has been considerably reduced in recent years. In order to continue to meet Ghana's forest resource needs, the government has initiated a series of programmes designed to restore lost forests. Mapping the potential for forest landscape restoration was, therefore, one of IUCN's contributions to ensure continuity of forest resources and the attendant environmental values they offer the country. The mapping exercise was supported by the German Ministry of Environment and involved international and national partners – notably World Resources Institute (WRI), the Ghana Forestry Commission (FC), the Centre for Remote Sensing and Geographical Information System (CERSGIS) of the University of Ghana, and stakeholder groups. The assessment merged 'the best of science' (i.e. GIS data) and 'the best of local knowledge' (obtained through multi-stakeholder dialogues).

The assessment activities started with an inception workshop which brought together representatives of government ministries, departments and agencies as well as civil society, NGO and private sector actors working on forest management and rehabilitation of degraded forests. CERSGIS, along with the Resources



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**One of the multi-stakeholder groups working on the FLR assessment in Ghana**

Management Support Centre (RMSC) produced the initial forest cover maps for the 10 geographical regions in Ghana, which formed the basis for a national multi stakeholder workshop involving scientists, farmers, civil society groups, etc. This was an effort to engage local knowledge in estimating forest restoration potential in regional settings. The combination of the GIS map data and the information gained from the dialogues led to the production of a national FLR opportunities map. The workshops were also used to gather relevant information for economic analysis of the various restoration options. This analysis led to the production of carbon abatement curves to rank the restoration interventions according to their net economic benefits per ton of $CO_2$ sequestered.

Both the national forest landscape restoration opportunities map and the economic analysis results were validated through a national multi stakeholder workshop involving representatives from government, civil society, research organizations and the private sector.

> In order to continue to meet Ghana's forest resource needs, the government has initiated a series of programmes designed to restore the lost forests.

The national FLR opportunity map produced has been in constant demand by the Ministry of Lands and Natural Resources, the Forestry Commission, the National REDD Working Group, and other national and international stakeholders. The map and the economic analysis are currently being used for decision -making in the forest sector – the Ghana Government, for example, has used the assessment results to prioritize the regions for their Forest Investment Programme.

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# The **Bonn Challenge**

**Horst Freiberg**, of the German Federal Environment
Ministry, presents the Bonn Challenge.

In September 2011, at a high-level event co-hosted by the German Ministry of the Environment and IUCN, the Bonn Challenge target was launched – it calls for the restoration of 150 million hectares of the world's deforested and degraded lands by 2020. Participants at the Bonn meeting vowed to promote a landscape approach to restoration, rather than narrower, more localized approaches (such as straightforward reforestation) and to highlight its importance and impact across sectors, including agriculture, energy, water, poverty alleviation and climate change.

The Bonn Challenge serves as an implementation platform for numerous existing international commitments with restoration components. It is pursued by a voluntary network of governments, international and non-governmental organizations and other groups.

The 150 million hectare target is based on analysis (described on page 3) that indicates that globally more than two billion hectares of land offer opportunities for restoration – from small mosaics of different land uses to large swathes of forest land. Achieving the ambitious target will have a dramatic impact on economic growth and the natural environment, particularly in parts of the world with currently bleak prospects.

## What are the potential impacts?

The Bonn Challenge target was designed specifically to make a significant contribution to existing international commitments, particularly the CBD Aichi Target 15, which is aiming for the restoration of at least 15 per cent of the world's degraded ecosystems by 2020, as well as the UNFCCC REDD+ goal to slow, halt and reverse forest cover loss by enhancing carbon sequestration.

IUCN has conducted analyses to estimate the economic and climate change impacts that could be achieved if the Bonn Challenge target is reached (see pages 13 and 14). They found that approximately 53 Gt $CO_2$e could be sequestered over the course of 50 years, reducing the annual emissions reduction gap by between 11 and 20 per cent, and more than US$ 80 billion per year could be injected into local and national economies.

## What has been the response so far?

The response to the Bonn Challenge has been phenomenal. Major commitments were made at two international fora in 2012 – the UN Sustainable Development 'Rio +20' talks in Rio de Janeiro in June and the UN Climate talks in Doha in December. Over 20 million hectares of forest landscapes have already been committed for restoration by the US, Rwanda, the Mata Atlantica Restoration Pact of Brazil, Costa Rica and El Salvador, and another 30 million hectares are on the way, following a public declaration of intent from India and from the Meso American Alliance of People and Forests. A number of other countries and organizations are preparing pledges as well.

During the 'Rio +20' talks in a global public vote, more than one million people voted the Bonn Challenge as the second most important issue upon which heads of state should act. There is now broad acknowledgement that the largest restoration initiative in history is truly underway. Yet much more remains to be done. Reaching the target will demand support on a truly global scale for forest landscape restoration initiatives around the world.

To help harness the obvious public appetite for action on restoration, Airbus and IUCN launched the Plant a Pledge

The announcement of the Bonn Challenge target has been seen as a watershed moment in the international recognition of forest and landscape restoration.

### Country commitments to date

| Country | Organization | Area committed for restoration (mn ha) |
|---|---|---|
| Brazil | Mata Atlantica Forest Restoration Pact* | 1.065 |
| Costa Rica | Government | up to 1 |
| El Salvador | Government | up to 1 |
| Rwanda | Government | 2 |
| USA | US Forest Service | 15 |

*a coalition of government agencies, NGOs and private sector partners

# 150
## million hectares by
# 2020

## Challenging Climate Change Impacts

In December 2012, when Herman Rosa Chavez, El Salvador's Minister of the Environment and Natural Resources, announced his country's commitment to restore one million hectares as a response to the Bonn Challenge, he made the motivations behind this commitment very clear:

*"Our commitment to restoring one million hectares - half the country's territory - is a serious and desperate response to a changing climate that earned El Salvador the first and fourth places in Germanwatch's Global Climate Risk Index in 2009 and 2011, respectively. With adequate support, landscape restoration at this scale will also allow us to make an important contribution to climate change mitigation and biodiversity conservation, greatly enhancing our carbon sinks, improving livelihoods, ecosystem services and disaster resilience. Landscape restoration may be seen as a mitigation strategy, but for El Salvador it is an urgent and essential element for adaptation and reducing escalating climate related losses and damages."*

Restoring 150 million hectares by 2020 could sequester approximately 53 Gt $CO_2$e over the course of 50 years and reduce the annual emissions reduction gap by between 11 and 20 per cent – as well as injecting more than US$ 80 billion per year into local and national economies.

campaign (www.plantapledge.com), which empowers people to call on governments, landowners and communities to contribute to the Bonn Challenge.

## How are commitments tracked?

IUCN and other GPFLR partners are working to help governments, landowners, corporations and NGOs define their prospective commitments, including: area to be restored, timescale (up to and beyond 2020), functions, purpose and types of restoration activities. Those who own or have the right to manage land pledged for restoration will be registered, supported and promoted by IUCN and the GPFLR, which will, wherever necessary, provide technical and

policy-related advice and information on restoration. Commitments will be announced at IUCN and GPFLR events over the coming months and will be made public on the GPFLR website (www.forestlandscaperestoration.org) and the Bonn Challenge website (www. bonnchallenge.org).

**Contact:** Visit www.bonnchallenge.org for more information about the Bonn Challenge.

# Plant a Pledge

**Bianca Jagger**, Founder and Chair of the Bianca Jagger Human Rights Foundation, Council of Europe Goodwill Ambassador and Plant a Pledge Campaign Ambassador, discusses how enlisting public support for forest restoration can effect meaningful change at a time when many international forums are failing to meet expectations.



Theodore Roosevelt said in 1907: "Within your lifetime the nation's need of trees will become serious. We of an older generation can get along with what we have, though with growing hardship; but in your full manhood and womanhood you will want what nature once so bountifully supplied and man so thoughtlessly destroyed; and because of that want you will reproach us, not for what we have used, but for what we have wasted."

In May 2012, I was appointed Ambassador to the 'Plant a Pledge' Campaign, organized by IUCN and supported by Airbus. We launched at the UN Conference on Sustainable Development, Rio+20, in June that year. Since then, Plant a Plant Pledge has been urging governments, businesses and civil society at large to support the Bonn Challenge target to restore 150 million hectares of degraded and deforested land by 2020 – the largest restoration initiative the world has ever seen.

Having campaigned for human rights and environmental protection for nearly thirty years, I know that widespread public support is vital in moving tough issues forward on the political agenda. I was immediately attracted to the primary focus of Plant a Pledge – to rally public support for the Bonn Challenge, to generate political pressure and solidify commitments on forest landscape restoration (FLR). An important function of Plant a Pledge is that it informs the public about FLR. It shows how FLR is different to, say, reforestation; it demonstrates where it's a more appropriate approach than the alternatives, and illustrates the benefits.

This grassroots approach is crucial. Global response to the imminent climate and environmental crises – at the COPs, at the UNCSD, in the corridors of power – has been painfully slow. Time and again world leaders and major climate change conferences – such as last year's Rio +20, the CBD COP11 and the UNFCCC COP18 – have failed to meet expectations, falling far short of what needs to be done to tackle global deforestation and keep average temperature rise to within 2 degrees Celsius.

In encouraging contrast to this lack of leadership, countries and landowners are making concrete pledges to contribute to the Bonn Challenge. With firm commitments of over 20 million hectares, from the US, Rwanda, Brazil, Costa Rica and El Salvador, plus additional commitments of 30 million hectares in the pipeline from India and Mesoamerica, we are already within reach of achieving one-third of the target.

Public response has also been promising. Thousands of people have pledged their support at www.plantapledge.com by signing a petition directed at world leaders, urging them to contribute to the Bonn Challenge target.

It's vital to maintain the momentum, and keep up the pressure on governments and landowners to commit to land restoration. Reforestation and other restoration projects, undertaken primarily in the US, are already re-establishing 850,000 hectares of forest each year and recent tree planting has created a further 200,000 hectares of new forest per annum. But more needs to be done.

Plant a Pledge and the Bonn Challenge offer the opportunity to effect measurable and transformative change. Restoring 150 million hectares of forest landscapes could sequester about 1 gigatonne of carbon dioxide per year, help lift millions of people out of poverty and inject more than US$ 80 billion per annum into local and global economies while reducing the annual carbon emissions gap by between 11 and 20 per cent, over the next 50 years.

Theodore Roosevelt's words, quoted above, have an even greater urgency today. If, as it seems, world leaders have forsaken our future, it is through initiatives such as Plant a Pledge that we will effect change. And the time to act is now, if we are to preserve a habitable planet for future generations.

**For more information:** visit www.biancajagger.org and www.plantapledge.com

# Back to the garden:
## the epic story of forest landscape restoration

**John D. Liu**, Director of Environmental Education Media Project (EEMP) and Senior Research Fellow with IUCN, tells how an encounter with landscape restoration ignited his passion for communicating a 'restorative' narrative.
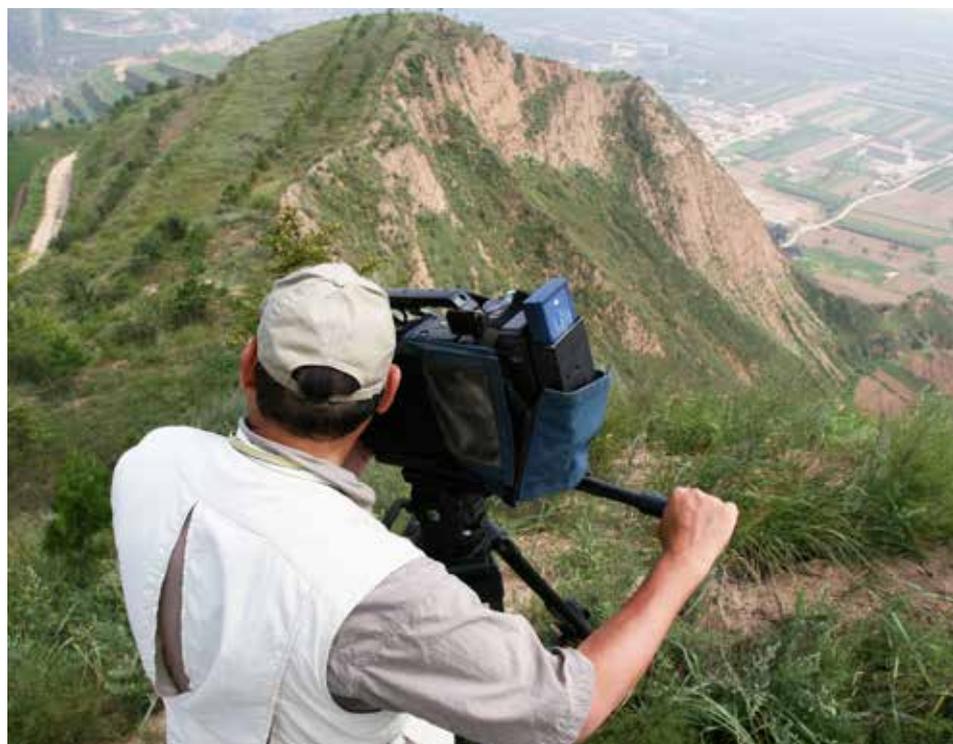


**John filming in the Loess Plateau, China**

For thousands of years as they warmed themselves by the fire, our ancestors listened intently to the storyteller while he or she passed on the knowledge acquired by generations long dead. We can imagine that long before the written word audiences marvelled at the heroic exploits of Odysseus and contemplated the implications of Adam and Eve bidding farewell to paradise. In other lands there were other stories, of Quetzalcoatl, Shen Nong or Zeus. These epic tales were of huge importance because they transmitted collective consciousness from generation to generation.

As a young photojournalist working for some of the world's largest television networks I covered the rise of China, the collapse of the Soviet Union, world leading corporations, and the tragedy of terrorism.

But my life forever changed in 1995 when I was asked by the World Bank to begin to document the rehabilitation of China's Loess Plateau.

The Loess Plateau was the birthplace of the Han race, the cradle of Chinese civilization, the second place on Earth where settled agriculture was practiced and the epicentre of some of humanity's most magnificent science and art. But by the mid-1990s the plateau was essentially a collapsed ecosystem, a development trajectory mirrored by many other cradles of civilization. Imagine filming from the top of a mountain and seeing virtually no vegetation in any direction and then returning continuously over the years to document as the area was restored to some semblance of normalcy and ecological function. Together with colleagues in China, the UK and the Netherlands I've told this story through several films including "*Lessons of the Loess Plateau*", "*Hope in a Changing Climate*" and "*Green Gold*".

Nothing I have seen in my 60 years on Earth compares to the importance of what I have documented in forest landscape restoration, first in China and then throughout the world. This story is human history, our great accomplishments, our ignorance, vanity, and growing wisdom. This narrative traces our interaction with the natural systems of the Earth and shows a measure of what we can do to heal the Earth and ourselves, if we so choose. On the Loess Plateau I witnessed something of profound importance and immediate relevance and was compelled to learn more. This has led to a long inquiry that has encompassed over 80 countries in all continents exposing me to the incredible beauty of plants and animals, the unique properties of specialized biodiversity, and the symbiotic interactions of natural systems.

For many years I've been working to communicate a new societal narrative. To realize and reflect that there is nothing wrong with the Earth's natural systems. It is we who must change our behaviour and align human life, human society and human economy with nature. Forest landscape restoration is the next chapter in the epic story of our relationship with the Earth. It is both a wonderful privilege and an awesome responsibility to understand and participate in this, the "great work" of our time. With this collective understanding, the epic tales of the future will remember this time as the moment when humanity moved to a new level of consciousness and restored paradise.

**Contact:** John D. Liu, johnliu@eempc.org. Visit www.eemp.org and www.whatifwechange.org to view some of John's films and presentations.

# Monitoring restored
## forest functions

IUCN is exploring ways to measure progress in forest landscape restoration, including re-establishment of different forest functions and ecosystem services. Workshops in the UK and Ghana have outlined a monitoring framework that IUCN is now field testing. **Nigel Dudley** of Equilibrium Research and **Gretchen Walters** of IUCN outline progress.



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**Workshop participants in Ghana visit a restoration site**

Forest landscape restoration aims to regain multiple forest functions at a landscape scale, to fulfil the needs of people, environment and biodiversity, using strategies agreed upon by affected stakeholder groups.

Successful forest landscape restoration requires indicators to measure progress and check that restoration strategies are successful. There have been several successful attempts to monitor the recovery of ecosystem services (including the dramatic improvements made in China's Loess Plateau, following a huge restoration program). IUCN has been working on the development of an overall monitoring framework that could be applied to similar large-scale restoration initiatives, such as those launched as part of the Bonn Challenge to restore 150 million hectares by 2020.

Workshops in Bristol, England and Busua, Ghana brought together specialists from academia and IUCN's Species Survival Commission (SSC) to develop a framework for measuring restoration success. They concluded that such a framework must measure both the *underlying conditions* needed for a functioning ecosystem and the *benefits* (ecosystem services) that the restored system provides. This means measuring attainment of a series of abiotic and biotic "thresholds" in restoration – such as adequate soil conditions, or trees reaching fruiting stage – the number of thresholds being influenced by the extent of forest loss and degradation. One or more *threshold indicators* are needed for

each threshold, along with some overall *progress indicators,* which measure more general trends in restoration. Thus, abiotic threshold indicators could include, for example: contamination, micro-topography, stability of substrate, soil properties, hydrology and basic net primary productivity, while biotic threshold indicators could include for example: ground/canopy cover, nitrogen fixation, pollinators, and invasive species that can prevent restoration.

Successful monitoring depends to a large extent on choosing appropriate indicators at site and landscape scales and at various points in the restoration process. Monitoring will take place at different timescales and under conditions of varying data quality and technical capacity: monitoring systems may sometimes be able to draw on trained natural and social scientists but in other cases will rely solely on local communities or untrained forest workers. IUCN will develop a *generic list of indicators*; projects will be able to select and adapt from this depending on local conditions.

So far this is a theoretical framework, but there are plans to test it in Ghana and other countries which are committed to restoring their forests. It can then be applied to measuring success in meeting the Bonn Challenge.

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# Potential climate impacts of FLR

**Stewart Maginnis**, Global Director of IUCN's Nature-based Solutions Group, and **Michael Verdone** of IUCN's Global Economics Programme, sum up the potential carbon sequestration benefits achievable by FLR initiatives.

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Global economic activity currently creates 36 Gt of annual CO2e emissions, a figure that is expected to rise to somewhere between 48 and 49 Gt by 2020. Nations have signed on to accords such as the Kyoto protocol, pledging to voluntarily reduce their annual emissions, but these voluntary emission reductions are not sufficient to keep the global mean temperature from increasing by 2 degrees Celsius above pre-industrial levels. In order to reduce the probability of a temperature rise of this magnitude, an additional 5-9 Gt of CO2e emissions must be abated or sequestered each year until 2020.[1] Finding ways of reducing this 'emissions gap' is therefore an urgent priority, and forest landscape restoration can have a significant role to play here. Forest landscapes already sequester approximately 1100 Gt of CO2e and according to global estimates, an additional 18-270 Gt CO2e could be sequestered through various forestry activities over the next 50 years.

## Global carbon sequestration potential

IUCN led a global analysis in 2011 that suggested achieving the Bonn Challenge – to restore 150 million hectares of deforested and degraded land by 2020 – would sequester approximately 53 Gt CO2e over the course of 50 years and reduce the annual emissions reduction gap by between 11 and 20 per cent.[2] The analysis showed that allowing primary and secondary forests to naturally regenerate, or assisting regeneration where necessary, could sequester 23 Gt of CO2e over 50 years while using agroforestry to restore the productivity of degraded agricultural land could sequester approximately 18 Gt of CO2e. Restoring degraded land with planted forests and forest plantations would sequester a further 12 Gt of CO2e.

## National carbon sequestration potential

In Ghana, the national FLR assessment included an estimation of the amount of carbon that could be captured by restoring the 10.5 million hectares of degraded and deforested land identified as available and suitable for restoration. While conventional wisdom maintains that restoring degraded primary and secondary forests in tropical regions with high biomass growth rates would store the most carbon of any intervention, IUCN found that improving farm fallows and using agroforestry to restore degraded land offered more opportunities to store carbon, given the larger areas involved. In Ghana, improving farm fallows can entail, for example, planting trees along the contours of sloping land during fallow preparations to improve soil stability and prevent erosion, and proactively excluding fire on fallow areas to optimize the formation of organic matter. The analysis in Ghana found that restoration of degraded agricultural land through agroforestry or improved farm fallows sequesters less carbon per hectare than wide-scale restoration interventions (such as natural regeneration of secondary and primary forest), but these types of restoration interventions have the potential to be applied to over four million hectares of degraded agricultural land and could sequester more than 50 per cent of all the carbon that could be captured through wide-scale restoration.[3]

> Voluntary emission reductions are not sufficient to keep the global mean temperature from increasing by 2 degrees Celsius above pre-industrial levels.

Analyses such as this can help countries identify the potential carbon sequestration gains from realizing their restoration potential and design frameworks to restore the productivity of degraded landscapes while also capturing significant climate-related benefits. This can open the way to correcting current market failures in land use by paying land managers to capture carbon by retaining or planting trees on forest landscapes.

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[1] Stern and Taylor (2010). What do the Appendices to the Copenhagen Accord tell us about global greenhouse gas emissions and the prospects for avoiding a rise in global average temperature of more than 2°C? Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment, United Nations Environment Programme.
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[2] This estimate is calculated by dividing the amount of carbon that FLR would sequester each year (53 Gt CO2e / 50 years = 1.06 Gt CO2e per year) by the minimum and maximum amount of carbon that must be sequestered each year until 2020 (5-9 Gt CO2e per year) to keep the average Global temperature from increasing beyond 2°C.

[3] Wide-scale interventions could potentially sequester 1 500 million tons of CO2e, while agroforestry and farm fallow could combine to sequester 1 750 million tons of CO2e.

# Economic impacts of FLR

**Michael Verdone,** of IUCN's Global Economics Programme, puts
some numbers on the benefits of forest landscape restoration.

As forest landscape restoration has now taken a prominent
place in international conservation agenda, attention is
shifting from policy to implementation. Many people are
interested to know what the economic impact of restoration
might be in terms of important social and environmental
goals such as securing livelihoods or increasing habitat for
wildlife.

### Local and national economic benefits
Experience has shown that restoring degraded and
deforested landscapes can replace expensive engineered
infrastructure, create economic growth, and offset global
emissions. For example, faced with a decision about how to
treat water, New York City decided to restore upstream
woodlands instead of investing in filtration plants in part
because restoration cost US$ 1.5 billion compared to
US$ 8-US$ 10 billion that the filtration plant would have
cost. In China, increases in forest cover created economic
growth in the country's forestry sector, which grew by more
than US$ 12 billion in 2008 during which 4.7 million
hectares of forest were restored.

More recently, researchers involved in the national
assessments of FLR potential in Mexico and Ghana (see
pages 6 and 7) calculated the potential economic benefits of
restoration. In Ghana, where the assessment identified 10.5
million hectares as suitable for restoration, the researchers
used published biomass growth data and market prices,
and assumed different stocking densities of tree species
for different types of restoration to estimate the associated
economic impacts. They calculated that each hectare of
restored forest in Ghana would create between US$ 2,250
and about US$ 13,000 per hectare in direct economic
impacts on the local and national economies over a twenty-
year period. Most of the value would come from increased
crop yields and timber harvests, although payments for
carbon sequestration services would also contribute to local
and national economies. Similar results were reported in
Latin America where researchers observed that passively
restoring rangeland back into native forest boosted the local
economy through the sale of carbon, non-timber forest
products, timber, and tourism by between $US 62 and
US$ 7 440 per hectare over a twenty-year period.[1] This
figure takes account of opportunity costs that were estimated
in terms of lost livestock production.

### Global economic benefits
If the experiences in the US, China and Latin America can
be replicated around the world, restoring degraded forest
landscapes could create several billion dollars of annual
economic activity for the global economy. Indeed, using
carbon data from WRI, IUCN has estimated that achieving

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the Bonn Challenge of restoring 150 million hectares of
degraded and deforested land could generate approximately
US$ 80 billion in material benefits, net of costs, annually,
providing direct, additional income opportunities to rural
communities. This estimate is based on the following
equation to calculate the potential economic impact of
restoration:

Value/Ha = Timber + Non-timber products + Crop yields +
Cultural and ancillary benefits + Carbon.

The figure includes: US$ 64 billion per year in net benefits
from the sale of wood products, US$ 8 billion of annual
benefits from the sale and consumption of non-wood forest
products (such as wild meat, cola nut, cardamom, etc.), an
annual net benefit of US$ 6 billion in terms of additional
crop yields, US$ 467 million in annual cultural and ancillary
benefits and US$ 5 billion in annual net benefits from
carbon sequestration, based on the social costs of carbon.[2]

### Challenges for implementation
The evidence shows that restoring degraded and deforested
landscapes can create significant economic impacts in
addition to achieving important social and environmental
goals. When it comes to implementation, national-level
restoration programs will require economic policies and
financing models that make restoration economically
competitive in a capitalist marketplace, in addition to
equitably sharing restoration's many benefits. The
experiences from countries and organizations that have used
forest landscape restoration to successfully achieve their
goals can provide guidance on how others can reproduce
their success and collectively achieve restoration goals, such
as the Bonn Challenge.

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[1] Birch C, Newton AC, Alvarez-Aquino C, Cantarello E, Echeverria C, et al.
2010. Cost-effectiveness of dryland forest restoration evaluated by spatial
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[2] Estimates of the Social Cost of Carbon: Background and Results from the
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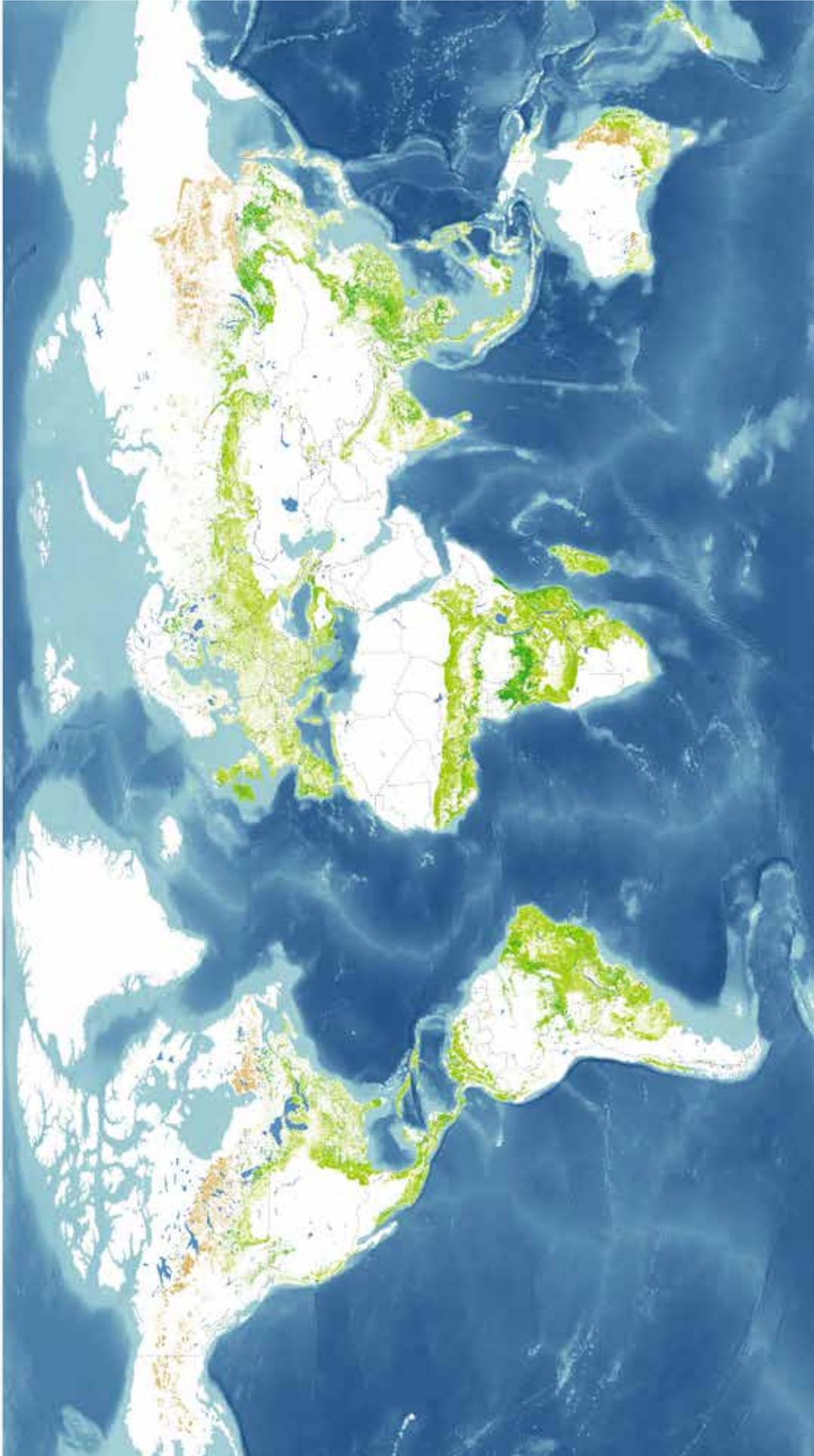
**FOREST LANDSCAPE RESTORATION OPPORTUNITIES**

- Wide-scale restoration
- Mosaic restoration
- Remote restoration

**Source:** Minnemeyer, S., Laestadius, L., Sizer, N., Saint-Laurent, C. and Potapov, P. (2011). A World of Opportunity. The Global Partnership on Forest Landscape Restoration, World Resources Institute, South Dakota State University and IUCN. http://pdf.wri.org/world_of_opportunity_brochure_2011-09.pdf

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## Restoring 150 million hectares of degraded and deforested land is an issue of the most basic human rights

**Bianca Jagger** talks about what forest restoration means to her.

**How does the issue of the Bonn Challenge and forest landscape restoration fit in with your other work?**

The Bianca Jagger Human Rights Foundation mandate is to defend human rights, achieve social justice, protect the environment, and speak up for present and future generations. Climate change will have devastating effects on every aspect of our lives: peace, security, human rights, poverty, hunger, health, land scarcity, mass migration and economics. Restoring 150 million hectares of degraded and deforested land is an issue of the most basic human rights - the rights to life, food, health and water, to name a few.

**Why do you think the Bonn Challenge is gaining so much attention?**

The Bonn Challenge is a historic agreement. World leaders have failed to sign a global, legally binding agreement to curb carbon emissions. We are not doing enough to avoid catastrophic climate change and we are not doing it fast enough. Land restoration is a goal that governments, corporations, NGOs, landowners, communities and individuals can commit to now that will have a real impact on reducing $CO_2$ emissions. It can effect change and improve the lives of millions – in our lifetime.

**Is this a truly global issue?**

Yes. Land restoration will be part of the solution to the looming climate, energy and water crises that we are facing in the world today. It's critical that all nations get behind the Bonn Challenge and Plant a Pledge. Land is already scarce, we face water shortages and droughts - and climate change remains a real and growing threat. We must act if we want to hand down a habitable world to future generations.

**What have you found to be the most common misconceptions about the issue of forest landscape restoration?**

People confuse land restoration with reforestation. Plant a Pledge and the Bonn Challenge are not just about planting trees. People and communities are at the heart of the restoration effort. It's about using land sustainably in a huge variety of ways – agriculture, protected wildlife reserves, ecological corridors, regenerated forests, managed plantations, agroforestry systems and river or lakeside plantings to protect waterways.

**The Bonn Challenge target date is 2020. What do you hope we will see in 2020?**

I hope that by 2020, forest landscape restoration will be well underway on 150 million hectares of degraded and deforested land.

I'd like to see the projects which are beginning now start to reap the rewards of their hard work – that previously degraded land will be providing food, fuel, shelter, shade, income, controlling soil erosion, reducing $CO_2$ emissions, conserving water and breathing oxygen into the atmosphere.

And I really hope that we'll have decided that restoring 150 million hectares is just the beginning…