

# RURAL

# 21

The International Journal for Rural Development

2 | 2021  
VOLUME 55

ISSN 1866-8011  
D 20506 F



# Biodiversity

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## Dear Reader,

"It has been shown that, paradoxically, where the most biodiverse natural resources occur, there is the greatest poverty ... It is very unjust that the communities bear the entire burden of environmental responsibility for these areas; for this reason, we seek compensation for the environmental services provided by the territory."

What Grisólogo Palomino, President of the Kiuñalla Commune in Apurímac, Peru, says perfectly sums up what this edition of Rural 21 is about: the diversity of our natural resources, how this diversity is distributed around the world, responsibility for maintaining it and fair compensation for those people who are the stewards of this diversity and thus enable us to benefit from its environmental services.

Why this topic, and why now? Just a few days ago, the UN Decade on Ecosystem Restoration was officially launched. It follows the UN Decade on Biodiversity, which closed with the sobering assessment that none of the targets which the international community had set itself on world-wide conservation of biodiversity, the so-called Aichi Targets, had been fully achieved. On the contrary, never before has species extinction progressed as rapidly as during the last 100 years. And this is happening despite our all being fully aware that biological diversity and its related ecosystem services – such as food, clean water, clean air and natural ingredients of medicines, to name just a few – are essential for the survival of humankind.

The latest report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services warns that already, three quarters of all terrestrial ecosystems and 40 per cent of all marine ecosystems have suffered severe anthropogenic changes. In most habitats, the number of naturally occurring species has dropped by an average of at least one fifth. More than 40 per cent of all amphibian species, nearly 33 per cent of reef-forming corals and more than a third of all mammal species are threatened. In other words, we are biting the hand that feeds us.

When the UN Decade on Ecosystem Restoration draws to a close, we will also have reached the target year of Agenda 2030, the year by which the Sustainable Development Goals (SDGs) ought to have been achieved. All of us know that the majority of these Goals cannot be reached if the current pace of biological extinction is not slowed down. And since the corona pandemic at the latest, it has become unambiguously clear just how closely the well-being of humans and that of nature are linked. So it is high time for us to rethink and completely revise our relationship with nature.

One opportunity for this comes up this year's October, when the international community gathers in Kunming, China, at the 15<sup>th</sup> Conference of the Parties of the UN Convention on Biological Diversity (COP15) to negotiate a new global biodiversity framework. What do we expect from these talks? We couldn't put it better than Christian Schwarzer, Founding Member of the Global Youth Biodiversity Network, who said at the recent European Development Days: "I want you to fight for biodiversity as if the life of your beloved family were at stake."

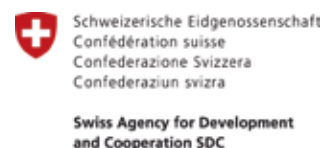
On that note, the Rural 21 editorial team wishes you inspiring reading.

*Silvia Richter*



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**Imprint****Rural 21 –**

The International Journal for Rural Development

**Published by:**

DLG-Verlag GmbH

Frankfurt, Germany

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**Editorial office, distribution, advertising:**

DLG-Verlag GmbH

Eschborner Landstraße 122

60489 Frankfurt, Germany

**Printed by:**

Bonifatius GmbH

33100 Paderborn, Germany

Rural 21 is published four times a year.

The subscription rate is EUR 33.– (Germany), EUR

37.– (EU countries), EUR 51.– (non-EU countries)

and EUR 8.30 per issue, plus postage.

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## European Development Days 2021: “The Green Deal for a Sustainable Future”

The challenges of biodiversity loss, climate change and environmental degradation were at the centre of this year’s European Development Days (EDD) that took place on the 15<sup>th</sup> and 16<sup>th</sup> June 2021. Under the motto “The Green Deal for a sustainable Future”, nearly 100 events were held on 17 thematic blocks: rural transformation and food systems; sustainable blue economy; water and sanitation; green and circular economy; pollution and

chemicals; green finance; green economy-related education and training; sustainable urbanisation; sustainable energy; climate change – natural resources, food and mobility; forest and landscape management; wildlife, security and development; seascapes and coastal areas; transboundary watersheds; Indigenous peoples and local communities, research, data and new technologies; protected area management and species conservation. What was new about this

14<sup>th</sup> edition of the event was not only that it was fully digital. This year, the opening ceremony, otherwise addressed by heads of state from all over the world, was handled entirely by 17 young people who participated – each with a focus on one of the topics dealt with – in the EDD Young Leaders Programme. Here and in the subsequent discussion rounds, they shared their expertise, ideas and ambitions for a sustainable future.

### Putting farmers and local communities at the core of food systems

Biodiversity loss, overuse of freshwater systems, soil degradation – Nachilala Nkombo, Zambia Country Director of WWF, took the effects of our current food systems as an opportunity to call for a radical change in agricultural production. The government’s current agricultural policy in her country was export-oriented, focused on monoculture (maize), and encouraged the use of artificial fertilisers – i.e. the exact opposite of sustainability, Nkombo explained. In order to achieve food security for the population while conserving the natural resources, in future, food systems ought to be in the hands of local communities; farmers should have a certain level of control of input use; in addition, they ought to be enabled to benefit from local knowledge and have more than one income stream.

Hindou Oumarou Ibrahim, founder and President of the Association for Indigenous Women and Peoples of Chad (AFPAT), explained how such a system could work in practice. In her country, conflict over access to fertile land is one of the biggest obstacles to sustainable land use. Land tenure was not clearly defined, and land grabbing was assuming drastic dimensions, both internally (by political elites) and externally (by big companies), Ibrahim reported. For example, this had become apparent at Lake Chad, where



“We are the land experts and engineers. It is time for Northern countries to learn from us”, Hindou Oumarou Ibrahim said in her video message.

Photo: European Commission

fences were cutting off the migratory routes for transhumant shepherds and their herds. One of the activities AFPAT is involved in to mitigate resource-based conflicts is participatory land mapping. In addition, the organisation is lobbying local authorities to ensure that each woman is given a piece of land. The women have to manage this land according to agroecological principles, e.g. by planting trees and cultivating seasonal crops beneath them. Thus income for women, resilience to

climate change, access to land and ecosystem restoration are combined. Charles Goerens, Member of the Committee on Development of the European Parliament, supported Ibrahim’s call for considering the rights of the communities more strongly. Goerens reminded the meeting that community rights over land were hundreds of years old. It was up to national governments to become active here and, for example, prevent foreign land grabs.

### Empowering women, keeping young people in rural areas

Sherine Omondi, EDD Young Leader Rural Transformation and Food Systems, is programme coordinator at K-Sammit. The Kenyan community-based organisation trains farmers on the importance of sustainable agriculture and in this context shows them the advantages of crop rotation. It also helps them to obtain rural credit and to develop small rural

markets. In order to empower women, K-Sammit distributes millet seed among women and encourages them to talk to their husbands who own the land. “Young people in the community tend to sell their land, which they have inherited, to make fast money. We attempt to maintain the land in a profitable condition so that the young people can keep and manage

it,” Omondi said. One achievement of K-Sammit was the development of an app providing young people with access to training via extension offices, without their having to have studied or received vocational education. In this manner, they learnt what to plant how and when, and how to tackle climate change, the EDD Young Leader explained.

## Win-win solutions for farmers, entrepreneurs, consumers and the planet

Maryam Abeiderrahmane is Administrator of Tiviski Dairy in Mauritania. Tivisky was founded in 1987 and is Africa's first camel milk dairy. It sources all of its milk from semi-nomadic subsistence herders, enabling them to earn income from their livestock. However, establishing this value chain was not easy, as Abeiderrahmane reported. The herders had to be persuaded to deliver their milk in sufficient quantities, and above all on time, to the collecting points, the consumers had to be convinced that local products were at least of the same quality or even better than imported products, and last but not least, the merchants had to be persuaded to also accept slender profit margins. By now, the availability of fresh camel milk and other milk products has replaced imported milk powder from Europe. "For such a value chain to work, everyone has to benefit from it – the herders, the milkers, the milk transporters and the shops," the entrepreneur said. For the pastoralists, participating in the chain above all paid its way through a healthy herd and more resilience in difficult years.

David Watson Mwabila, EDD Young Leader Climate change: natural resources, food and mobility, is managing director and co-founder of Fourth Line Limited. The idea behind this Zambian social enterprise is to enable smallholder farmers to produce high value honey destined for global markets, thus enhancing livelihood improvement for communities across Africa while saving the forest. For him, in addition to entrepreneurial and innovative skills, the biggest challenge for youth and women on the way to becoming an agripreneur is access to finance. For example, he and his colleagues had



Jutta Urpilainen, EU Commissioner for International Partnerships. The EU is to dedicate ten per cent of its budget to biodiversity objectives.

Photo: European Commission

worked on their project for more than a year before support came from the Bill&Melinda Gates foundation. "Start where you are, don't wait until the conditions are perfect," was his message to young entrepreneurs.

## Eight priorities for the EU and its partners

In the closing ceremony of the EDD, a high-level group of 13 international scientists and practitioners proposed eight recommendations on how the EU and its partners can address the biodiversity and climate crises, whilst ensuring green growth for people around the world:

- protecting 30 per cent of land and sea areas, and reducing tropical deforestation and degradation by 75 per cent by 2025 and nearly 100 per cent by 2030;
- restoring 300 million hectares by 2030, generating an estimated 8 trillion euros in ecosystem services and removing up to 26 gigatons of greenhouse gases from the atmosphere;
- continuing to help smallholder farmers and fishers in Africa and around the world improve the productivity, sustainability and resilience of food systems, supporting efforts towards implementing agro-ecological and regenerative agriculture approaches on 30 per cent to 50 per cent of agricultural lands;
- supporting a strong enforcement of regulations on wildlife crime and monitoring of wildlife;
- supporting substantial programmes to fill the implementation knowledge gap along with a specific attention to interactions between biodiversity and health (One Health), in particular around pandemics and nutrition issues;
- ensuring that all actions to restore and conserve biodiversity closely involve indigenous peoples and local communities, who already manage 35 per cent

- of remaining intact forests, often highly effectively;
- supporting EU partners to implement biodiversity-relevant multilateral environmental agreements and improving coherence of biodiversity-related policies at national level;
- promoting green investments for biodiversity. The high-level group encourages the EU to integrate biodiversity in its wider efforts to set up a financial system that supports global sustainable growth.

The recommendations are to feed into the ongoing negotiations for a future global biodiversity framework to be adopted at the 15<sup>th</sup> Conference of the Parties to the UN Convention on Biological Diversity (COP15), to take place in Kunming, China in October of this year.

## For a systematic transformation of all economic sectors

So is everything on track regarding biodiversity? Not at all, says Christian Schwarzer, Founding Member of the Global Youth Biodiversity Network. His organisation, representing around 600 youth organisations from all over the world, has already participated in six rounds of negotiations on the CBD. "I'm so tired of hearing that we failed once again the targets that we have all agreed on,"

Schwarzer complains, noting that what is lacking is policy coherence, clear actionable ideas, access of youth, grassroots organisations and indigenous communities to funding mechanisms and legally binding definitions of what nature-based solutions really are – so that they can really achieve results in linking combating global warming and biodiversity conservation. Schwarzer maintains that a systematic trans-

formation of the entire economic sector, in which gender and intergenerational equality is immanent, is needed. "I want you to fight for biodiversity as if the life of your beloved family were at stake!" he called on the conference participants.



# Protecting biodiversity requires transforming human-nature relations

By Tatjana von Steiger and Peter Messerli



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With global warming showing no sign of abating, population figures set to soar to ten billion by 2050 and biodiversity loss progressing, the need for transforming human-environmental systems is becoming only all too apparent. Our authors review the prospects for putting such a transformation into practice, stressing that reconciling human with environmental well-being requires a fundamental rethink process in which many voices need to be heard.

The UN Decade on Ecosystem Restoration got underway on the 5<sup>th</sup> June, setting the tone for upcoming summits on food systems, climate change, and biodiversity. It is a call for addressing, in an integrated manner, the triple challenge faced by humankind over the next 30 years: feeding ten billion people, keeping the global temperature increase below 1.5°C and halting – better still, reversing – biodiversity loss.

However, progress towards the Aichi Biodiversity Targets (see page 9), the Paris Agreement and, most importantly, the overarching framework for sustainable development – the 2030 Agenda – has been meagre, and the global pandemic is causing further setbacks. To manage the turnaround in this decisive decade, we will have to move from just repairing, to actually transforming, human-environmental systems.

The message is loud and clear: we need transformational change across economic, social, political, financial, scientific and technological domains. It is voiced in numerous reports, including the Global Assessment Report on Ecosystems and Biodiversity by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the UN's Global Sustainable Development Report (GSDR), the reports on climate change and land issued by the Intergovernmental Panel on Climate Change (IPCC), the EAT-Lancet commission on Food, Planet, Health – and, last but not least – the recent United Nations Environment Programme synthesis report, *Making Peace with Nature*. Still, we may ask, is it realistic to develop, within a decade, strategies which have the strength to transform the predominant models in a way that will avoid dangerous climate change, halt and reverse dramatic biodiversity loss, and meet the needs

of a growing global human population to lead the lives they value and aspire to? And how can such a transformation deal with existing power relations of actors in politics, research, the private sector and civil society, to create alliances for change and overcome obstacles and resistance?

## The limits of commodification and protection

A good opportunity for such reflections is presented by COP15, the upcoming 15<sup>th</sup> meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD) in Kunming, China. The debate on how to halt/reverse biodiversity loss is itself controversial and raises many questions. Is it possible to reconfigure the harmful relation between people and nature using the current economic mod-

el, e.g. through certified commodity chains, ecotourism, payment for ecosystem service schemes or new modes of capital investments? Or is the current economic model the root cause of the problems we are trying to solve, and should we therefore avoid it as a remedy altogether? Should nature then rather be separated from people and allocated a specific share of the planet, to shield it from the consequences of the unwavering belief in the power of economic growth and technological progress? Or would separating nature from people in the era of the Anthropocene be not only utopic, but also highly unjust?

These radical aspirations and diverging ideas – but also the unresolved questions – show that we need to move to innovative approaches that offer a more differentiated model for solving this challenge. In other words, a third way enabling humans to share our only planet with other life on Earth. Such approaches can emerge when relevant actors critically assess the limits of their own perspectives and understand the necessity of a whole-of-society approach, as proposed by the UN's Global Sustainable Development Report or UNEP's *Making Peace with Nature*. This implies committing to a pluralistic perspective that is solution- rather than problem-oriented, where “biodiversity can represent a meeting point for the well-being of nature and people”, as described by Unai Pascual and colleagues in *Nature Sustainability*.

## Rethinking human-nature relationships

An entire re-think is necessary to overcome the dichotomy between nature and people, and to reconfigure the relationship from a vicious to a virtuous cycle. A pluralistic perspective or a whole-of-society approach to address the triple challenge of creating sustainable food systems, adapting to/ mitigating climate change, and halting/ reversing biodiversity loss only makes sense if we acknowledge the engagement of different knowledge and value systems with nature. It can only work if these various views and voices are really heard and the people holding them are given the opportunity to participate in reflecting on and defining human-nature relationships and practices.

For this endeavour to succeed, it must be underpinned by social and environmental justice. As a compass, social and environmental justice can guide the new thinking about conservation and how we structure interactions among different actors with varying world views, values

and knowledge systems from science, policy and practice. Not only will this allow a disentangling of the multiple drivers of biodiversity decline. It will also help to address the trade-offs and identify the co-benefits between nature and people as a basis for a solution-oriented perspective promoting just nature-people relations.

Metrics and new ways of assessing progress of such new approaches are equally important. In adjusting the Human Development Index (HDI) to become the Planetary pressures-adjusted Human Development Index (PHDI), the 2020 Human Development Report is a concrete example of how to build a more pluralistic perspective. Besides measuring life expectancy, education and per capita income, the index offers countries another score adjusted for carbon dioxide emissions and material consumption. This lays bare a country's ecological footprint, offering a more comprehensive and objective assessment of where this country stands in its relation to nature. The adjusted index is therefore a stark example of how different the global landscape would look if progress were defined as the well-being of both people and planet.

## Systemic transformation needs context-specific pathways

A Human Development Index adjusted by its planetary footprint not only shows a different pattern of a country's performance, it also highlights the heterogeneity of countries' development challenges, priorities and needs. Although the challenge of reconciling human well-being with environmental stewardship represents a universal task and the distance to this target is great for high- and low-income countries alike, just solutions must be developed in concrete local contexts, taking into account the specificities of local human-environment systems and their socio-political arenas. Developing such context-specific pathways thus represents an important precondition to

ensuring the plurality of answers needed to respond to the global challenges at hand.

The newly established Wyss Academy for Nature at the University of Bern, Switzerland (see Box) is committed to catalysing such innovative pathways to manage the above-mentioned triple challenge of land use/ food systems, biodiversity loss and climate change – in concrete local contexts around the world. By putting social and environmental justice centre stage, we strive to break down prevailing silos of sectors, stakeholders and mindsets. More specifically, we want to bring together science, policy and practice to co-design pathways that will have a timely impact while being just and evidence-based:

- **Science:** Rigorous science can help to address the underlying dysfunctions in food and economic systems and the way in which energy and infrastructure are provided. Moreover, new research can pursue human well-being and the stewardship of biodiversity, land and climate. It must reach out beyond academia to be complemented and enriched by lay, practical and local knowledge.
- **Policy:** Bringing knowledge to power means engaging with key decision-makers from academia, business, policy, finance and civil society. Supported by knowledge diplomacy, we aim at joint learning and negotiating processes to overcome blockages and create alliances to leverage systems transformation.
- **Practice:** Sourcing innovative ideas from science, policy and practice is the basis for co-designing solutions that will be incubated and tested in concrete contexts.

Initiating an iterative circle of collaboration between these key partners, we strive to create a new type of humus. In this fertile environ-

## ABOUT THE WYSS ACADEMY FOR NATURE

At the Wyss Academy for Nature at the University of Bern, research, business, policy-makers and communities come together to co-design solutions for sustainable futures. The Academy's mission is to turn scientific knowledge into action. Combining ambitious, innovative goals with a transformative approach, it was founded in 2020 to develop innovative long-term pathways that strengthen and reconcile biodiversity conservation, human well-being and the sustainable use of natural resources in a variety of landscapes throughout the world. We co-design and implement concrete projects across a swathe of regions and countries. This global structure facilitates the replication of successes and learning. The Wyss Academy for Nature currently operates Hubs in Central Europe (Bern, Switzerland), Southeast Asia, East Africa and South America.





The Planetary pressures-adjusted Human Development Index (PHDI) allows conclusions to be drawn regarding a country's ecological footprint.

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ment, learning from success and failure allows new policies and practices for sustainable and just futures to be developed and provides the basis for scaling solutions beyond local contexts.

### Creating "solutionscapes"

To transform the above tenets into concrete and actionable approaches, the Wyss Academy for Nature is focusing on land systems and their role in sustainable rural development as an entry point. The multi-functionality of landscapes across space and time allows multiple claims to be satisfied for a vast variety of goods and services such as food, fibre, water, carbon sequestration, conservation, recreation, culture and much more. The careful design and planning of land systems thus not only holds the key to solving the above-mentioned triple challenge of creating sustainable food systems, mitigating/ adapting to climate change and halting/ reversing biodiversity loss. It is also the most important bridge between nature and people – and between the SDGs.

Yet, landscapes are not always governed towards efficiency, justice, and sustainability. Land use policies often reflect power structures, short-term political considerations, greed and choices based on insufficient data

and reasoning. Furthermore, globalised flows of commodities, capital, people and information are shaping landscapes from a distance – and by powerful actors – rendering obsolete traditional planning units such as watersheds or administrative boundaries, adding new sustainability challenges but also opportunities to lever change.

Against this backdrop, the Wyss Academy has developed an approach we call solutionscapes. Guided by the goal of social and environmental justice, we identify options for navigating complex land systems and involve change agents to initiate transformations across space and scale. Using knowledge diplomacy, we use rigorous science to engage with key stakeholders from business, finance, policy, and civil society to overcome blockages and create alliances to leverage change. And we source innovative ideas and co-design projects that will be incubated and tested in concrete contexts. Via a Synthesis Centre and targeted Global Policy Outreach, we will collaborate with innovators and networks around the globe and share our insights with partners in policy, academia, business, finance and civil society. Ultimately, our success will be measured by our contribution to transformative changes of policies and practices that lead to sustainable and just futures for nature and people.

At the Wyss Academy, we strongly believe that complexity can be embraced in bringing together different perspectives. Science that is put at the service of local needs will help to design novel but concrete pathways towards sustainable development. Inevitable trade-offs can be turned into opportunities. Let's be humble, but bold – remembering that, as environmental scientist Erle C. Ellis wrote, "the planet we make will reflect the people we are".

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The Convention on Biological Diversity (CBD) is the most important multilateral set of agreements on the conservation of the Earth's biodiversity. It entered into force on the 29<sup>th</sup> December 1993. Together with the United Nations Framework Convention on Climate Change (UNFCCC) and the UN Convention to Combat Desertification (UNCCD), the CBD is one of the three International Law agreements adopted at the 1992 United Nations Conference on Environment and Development 1992 in Rio de Janeiro, Brazil.

On the 22<sup>nd</sup> December 2010, the United Nations declared the years 2011 to 2020 the UN Decade of Biodiversity, following a recommendation by the signatory states at the Tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10), held in Nagoya, Japan, in the Prefecture of Aichi, in October 2010. At COP10, the so-called Aichi Targets on world-wide conservation of biodiversity were adopted which were to be achieved by 2020. They comprise five Strategic Goals and 20 Targets:

**Strategic Goal A:** *Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*

**Target 1:** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

**Target 2:** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

**Target 3:** By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

**Target 4:** By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

**Strategic Goal B:** *Reduce the direct pressures on biodiversity and promote sustainable use*

**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 6:** By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

**Target 7:** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

**Target 8:** By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

**Target 9:** By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

**Target 10:** By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

**Strategic Goal C:** *To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*

**Target 11:** By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

**Target 12:** By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

**Target 13:** By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

**Strategic Goal D:** *Enhance the benefits to all from biodiversity and ecosystem services*

**Target 14:** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

**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.

**Target 16:** By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

**Strategic Goal E:** *Enhance implementation through participatory planning, knowledge management and capacity building*

**Target 17:** By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

**Target 18:** By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

**Target 19:** By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

**Target 20:** By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011–2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.



Nature-based solutions such as the conservation of mangroves for coastal protection yield high benefits. Here, conservation is combined with crab breeding.

Photo: Jörg Böhling

## The economics of biodiversity

The World Economic Forum has established that over half of the world's GDP is highly dependent on nature and its services. But what do we really know about the link between ecosystem services and biodiversity, economic prosperity and human well-being? And are all the yardsticks we use for evaluating really the right ones? Our author shows why a paradigm shift is needed in the way we perceive progress and well-being and what the role of nature-based solutions can be in this context.

**By K. N. Ninan**

Despite the pledge to halt the loss of biodiversity and ecosystem services, most countries have failed to achieve the 20 Aichi Biodiversity Targets (see page 9) as stated in the UN's Strategic Plan for Biodiversity 2011–2020. Degradation of biodiversity and ecosystems has continued unabated, if not accelerated, during the last decade. The recent Global Assessment Report on Biodiversity and Ecosystem Services conducted by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) notes that one million species are at risk of extinction during the coming decades. Out of 18 ecosystem services evaluat-

ed, except for agricultural, fish and bioenergy production and material harvest, all services reported negative trends between 1970 and 2019. According to the Center for International Forestry Research (CIFOR), each year, the world loses 6.3 trillion US dollars (USD) worth of ecological services due to forest and land degradation. An IPBES report notes that loss of pollinators threatens global crop output worth between 235 billion and 577 billion USD annually. Pollution is estimated to cause around 9 million premature deaths annually, and other environment-related health risks claim millions more each year. Land use

and land cover change and climate change are among the major drivers contributing to loss of biodiversity and ecosystem services. If unchecked, this will have an adverse impact on economies, ecosystems, lives and livelihoods. It will also jeopardise achievement of the Sustainable Development Goals (SDGs).

Biodiversity provides several goods and services that are critical to human well-being and good quality of life. The genetic pool that it contains helps develop new crop varieties and drugs which are assuming relevance in combatting the adverse effects of rapid environmental



change. Nature can help reduce vulnerability to climate and health risks. A UN report estimated the direct economic losses due to disasters between 1998 and 2017 at 2.98 trillion USD (in 2017 USD), of which climate-related losses accounted for 78 per cent.

### Economics – not only monetary terms count

The economic benefits offered by biodiversity and ecosystem services are immense. For instance, the annual economic value of ecosystem services provided by forest ecosystems is worth billions of US dollars (see Table). Estimated economic values are however sensitive to the methods, norms and prices used to value ecosystem services, as well as the number of ecosystem services evaluated. There are other values of nature (e.g. relational values referring to the quality of human-nature interactions) which cannot be expressed in monetary terms. Experts therefore advocate the use of plural approaches to assess the diverse values of nature. Economic valuation is however useful since it speaks in the language easily understood by policy-makers. Besides, it underlines the point that just because an ecosystem service is not traded in a market or difficult to value, it need not be a zero-priced good or have no value. Merely that oxygen – the provision of which is a life-giving service – is freely available in the atmosphere does not mean that it has no economic value. The raging second COVID-19 wave in India has helped to gauge the true economic value of oxygen with COVID-19-stricken patients desperately trying to purchase oxygen cylinders or the Indian government and other agencies making emergency purchases or imports of oxygen tanks, concentrators and cylinders.

### Human well-being and SDGs

Apart from providing multiple benefits to people, in terms of biodiversity and ecosystem services, nature helps reduce vulnerability to climate-related disasters and extreme weather events as well as health risks. It plays an important role in influencing human well-being and good quality of life. Two of the SDGs, SDG 14 and SDG 15 (Life below Water and Life on Land), relate to marine and terrestrial ecosystems covering biodiversity and ecosystem services. Most of the 17 SDGs refer directly or indirectly to nature, addressing poverty, hunger, health, water, sanitation, etc. Missing the 20 Aichi Biodiversity Targets already imperils achievement of the SDGs, which is

further jeopardised by the COVID-19 pandemic. While framing the post-2020 biodiversity targets, there is a need to align them such that they fit in with the metrics tracked by the SDGs.

Nature-based activities contribute a significant share to the incomes and well-being of many nations especially developing countries, and of poor and indigenous communities. The report by the World Economic Forum (WEF) on *Nature Risks Rising* notes that some of the fastest growing economies of the world are highly vulnerable to nature loss. For example, about a third of the gross domestic product (GDP) in India and Indonesia is generated in nature-dependent sectors. African countries reported this share to be 23 per cent of their GDP. Even large economies such as China, the EU and the USA, which together account for 60 per cent of global GDP, reported high amounts of GDP as being generated in nature-dependent sectors, i.e. 2.7 trillion USD in China, 2.4 trillion USD in the EU and 2.1 trillion USD in the USA. Poor and indigenous communities rely on the natural environment for subsistence, income, and employment. Non-timber forest products (NTFPs) and forest employment contribute a significant share to their household income (see Figure on page 13).

The WEF report analysed 163 industries and their supply chains and found that about 44 trillion USD of economic value generation

– over half of the world's GDP – is highly dependent on nature and its services. Sectors here include construction, agriculture, food and beverages, with an economic value of 7.9 trillion USD – roughly twice the size of Germany's economy (about 4 trillion USD). The pharmaceutical industry depends on tropical rainforests and plants for many existing and potential drugs. For instance, 25 per cent of drugs used in modern medicine are derived from rainforest plants. About 50 per cent of prescription drugs are based on molecules coming from plants.

### Benefits of nature-based solutions

Nature-based solutions (NBS – see Box on page 12) are being advocated to reduce vulnerability to the risks posed by climate change, environmental degradation and zoonotic diseases. NBS are cost-effective and can help promote multiple objectives such as climate stabilisation, conservation and development. They have co-benefits such as generating job opportunities and enhancing biodiversity, and are critical for realising the SDGs.

The economic benefits of NBS are significant. The conservation of mangroves, protected areas, floodplains and watersheds yields high benefits, including non-market benefits such as carbon sequestration, soil and water conservation as well as flood manage-

### Economic value of forest ecosystem services: Review of selected studies

Forest site/ ecosystem	Number of ecosystem services evaluated	2020 PPP USD <sup>(A)</sup>		Author
		Billion USD	USD/ hectare	
Brazilian Amazon	No information available	174.5 (2,480.6) <sup>(B)</sup>	-	Gutierrez and Pearce, 1992
Mexican Forest	4	13.06	254.0	Adger et al., 1995
Korup National Park, Cameroon	5	0.02	231.6	Ruitenbeek, 1989
Mount Kenya forest reserve, Kenya	5	0.24	890.2	Emerton, 1999
Leuser National Park, Sumatra, Indonesia	11	14.2 to 19.0 <sup>(C)</sup>	5,531 to 7,513 <sup>(C)</sup> (220.8 to 300.3) <sup>(D)</sup>	Beukering et al., 2003
Oku Aizu forest reserve, Fukushima, Japan	7	1.4 to 1.45	16,675 to 17,318	Ninan and Inoue, 2013a
Meta-analysis of 40 forest valuation studies from around the world	1 to 14	-	9.5 to 4,843	Ninan and Inoue, 2013b

(A) Estimated values in different studies which were converted into 2010 purchasing power parity (PPP) US dollars (USD) in Ninan and Inoue, 2013b, have been converted into 2020 USD terms using the US Consumer Price Index for all US Urban Consumers. Values are annual values unless mentioned otherwise. Since prices of commodities vary across countries, to make the estimated values comparable across countries it is common to convert the estimated values in local currencies into PPP USD (or international dollars) using the PPP series compiled by the United Nations or the World Bank.

(B) Net present value (NPV)

(C) Present value (PV)

(D) Annuities

ment and storm protection services (see Table below). For instance, a study in Thailand estimated the net benefits from conserving mangroves to be 3.6 times higher than from shrimp farming. Another study noted the avoided losses from coastal flooding and other non-market benefits from mangrove forests valued at 120–130 billion USD per year globally. A study of floodplain restoration in Waza, Cameroon, established a 6.5:1 benefit-cost ratio (BCR) with improved flood management and water flow benefits. The Rewilding Europe project has reported encouraging results with recovery of ecosystem health, species and co-benefits such as an increase in tourist visitation rates. A UN report notes that restoring 350 million hectares of degraded landscapes globally by 2030, as envisaged in the Bonn Challenge, would yield benefits worth 9 trillion USD for an investment of 1 trillion USD (about 0.1 per cent of global GDP between 2021 and 2030), remove an additional 13–26 gigatons from the atmosphere and contribute to poverty alleviation.

NBS could also form part of COVID-19-recovery stimulus programmes.

### How to enhance biodiversity and economic prosperity – key messages of the Dasgupta Biodiversity Review

The COP15 meeting of the UN's Convention on Biological Diversity in Kunming, China, from the 11<sup>th</sup> to the 24<sup>th</sup> October 2021, is expected to finalise the post-2020 global biodiversity conservation framework for a future where humankind lives in harmony with nature. In this context, it is worth looking at the key messages of a review commissioned by the UK Government headed by Sir Partha Dasgupta to assess the economic value of biodiversity and to identify actions that will simultaneously enhance biodiversity and economic prosperity. The review calls for a paradigm shift in the way we think, act and measure economic success and to protect and enhance our prosperity and the natural world.

### NATURE-BASED SOLUTIONS (NBS)

The International Union for the Conservation of Nature (IUCN) defines NBS as “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”, with climate change, food security, disaster risks, water security, social and economic development as well as human health being the common societal challenges.

It calls for institutional, market, financial and educational reforms to improve the outcomes for nature. The review's key messages include the following:

- The way in which governments assess progress or well-being in terms of GDP has to change. GDP is a flawed measure since it ignores how environmental degradation or income distribution impact long-term well-being. For example, a barrel of oil or a tonne of iron ore extracted today is counted as an addition to GDP. Being non-renewable, these resources once extracted are no longer available for future generations and hence will constrain long-term economic growth and welfare. Traditional national income accounts consider depreciation of anthropogenic capital, but not of natural capital, even though its depletion will affect long-term well-being and sustainable development. The review argues that to accurately measure well-being, one ought to consider the concept of inclusive wealth, which covers produced capital (factories, machines and roads), human capital (skills and knowledge) and natural capital (e.g. soils, forests and lakes). Tracking the changes in these three forms of assets will better capture social well-being. UNEP's *Inclusive Wealth Report 2018* compared the per capita GDP (income) growth in 140 countries with per capita (inclusive) wealth and noted that 44 out of 140 countries reported a decline in per capita (inclusive) wealth between 1990 and 2014, even though per capita GDP increased in most countries. However, like GDP, the inclusive wealth index (IWI) also has shortcomings in that it does not tell us anything about income (or wealth) distribution within countries, which affects well-being.
- The coverage and investments in protected areas (PAs) need to be increased both on the land and in the seas. According to the report, to protect 30 per cent of the world's

### Economic benefits of nature-based solutions: selected cases

Cases	Country	Benefit	Net present values (NPV)/ benefit-cost ratios (BCR)	Author
Mangrove versus shrimp farming	Thailand	Carbon sequestration, biodiversity, storm protection, nursery for fisheries, income & employment	USD 60,000/ ha versus USD 16,700/ ha in 2006 USD <sup>(A)</sup> BCR: 3.6:1	Balmford et al., 2002
Mangrove forests	Global	Avoided losses from coastal flooding and protection  Other non-market benefits provided	USD 80 billion per year  USD 40–50 billion per year	Global Commission on Adaptation, 2019
Protected forests – Nagarhole National Park	Karnataka, India	NTFPs, soil and water conservation, carbon sequestration, nutrient cycling, air pollution control, recreation, and other benefits	Net annual benefits: USD 13–148 million (or USD 203/ ha to USD 2,294/ ha) in 2014 USD using alternative valuation methods and prices	Ninan and Kontoleon, 2016
Floodplain restoration	Waza, Cameroon	Improved flood management, additional water flow	NPV – USD 7.8 million <sup>(B)</sup> BCR – 6.5:1	IUCN, 2003
Watershed development	Mittemari, India	Increase in agricultural yields, water table and other benefits	NPV – USD 0.32 million to USD 1.7 million in 1989–1990 USD <sup>(C)</sup> BCR – 1.2 to 1.8	Ninan and Lakshmi-mikanthamma, 2001
Coastal wetlands	USA	Storm protection	Value: USD 23.2 billion. 1 ha wetland loss leads to an average of USD 33,000 increase in storm damages	Costanza et al., 2008

(A) Net present values (NPVs) estimated using 6 per cent discount rate; cash flows summed over 30 years.

(B) NPV estimated using 10 per cent discount rate; cash flows summed over 25 years.

(C) NPVs estimated using alternate discount rates of 3 per cent, 5 per cent and 8 per cent; cash flows summed over 25 years.





Non-timber forest products play a major role in sustaining the livelihoods of rural indigenous communities.

Photo: Jörg Böhling

land and oceans and manage them effectively by 2030 would require an average investment of 140 billion USD annually, which is just about 0.16 per cent of global GDP and less than a third of the current global subsidies supporting activities that destroy nature. The benefits from this would be immense and include lowering climate and health risks. Let alone increasing the coverage of PAs, the report notes that only 20 per cent of existing PAs are managed well.

It calls for greater involvement of indigenous people and local communities in their management.

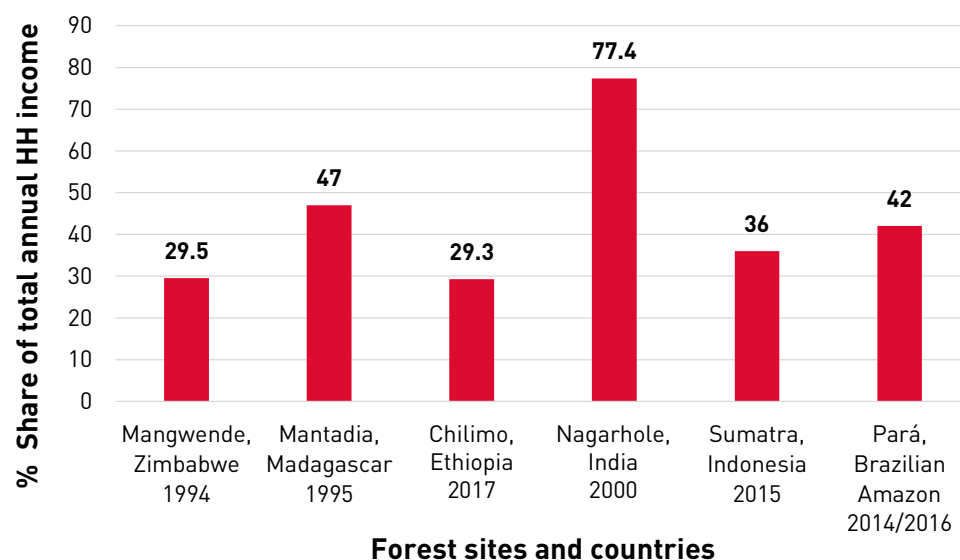
- Maintaining our current living standards would require 1.6 Earths, which is unsustainable. The review calls for a shift towards a sustainable food production system, decarbonising our energy and transport systems, reordering our consumption and production patterns, and reducing food wastages estimated at a third of global food produc-

tion to lower our carbon footprint. Further, it emphasises the need to reduce perverse subsidies (globally estimated at 4–6 trillion USD annually) that favour destruction of nature. It calls for increased financial flows and implementation of Payment for Ecosystem Services (PES) schemes and Debt for Nature swaps to reward those countries and communities who conserve and supply ecosystem services.

- Businesses and financial institutions are increasingly concerned about nature-related financial risks and their impact on their production and revenues. They therefore need to incorporate sustainability concerns to hedge their businesses and institutions from these risks. The report calls for an increase in green investments and nature-based solutions to address the nature-related risks faced by businesses, financial institutions, and economies.
- To connect people with nature, the review calls for reforming our educational system, whereby studying natural history is made part of the curriculum from the early stages. Ultimately, all citizens should in part be naturalists. The review calls for empowering citizens to ensure better outcomes for nature.

Unless there is a transformative change in the way that governments and societies perceive the value and role of nature to promote human well-being and sustainable development prospects for biodiversity and humankind will remain grim. If you take care of nature, nature will take care of you. If you abuse nature, nature too will abuse you. In the words of Mahatma Gandhi: “Earth provides enough to satisfy every man’s needs, but not every man’s greed.”

### Share of non-timber forest products & forest employment of total annual household income of rural/ indigenous communities



Note: Figure for Nagarhole, India consists of: NTFPs – 28.1 %; forest employment – 49.3 %.

Source: SCBD, 2001; Ninan et al., 2007; Demie, 2019; Widianingsih et al., 2016; Antunes et al., 2021

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# Food system transformation starts and ends with diversity

While having failed to solve problems such as hunger or malnutrition, industrial agriculture appears to be causing additional ones both in environmental and health terms. Our author calls for a transformation of the food system and highlights the key role of diversity in this context.

By Emile Frison and Nick Jacobs

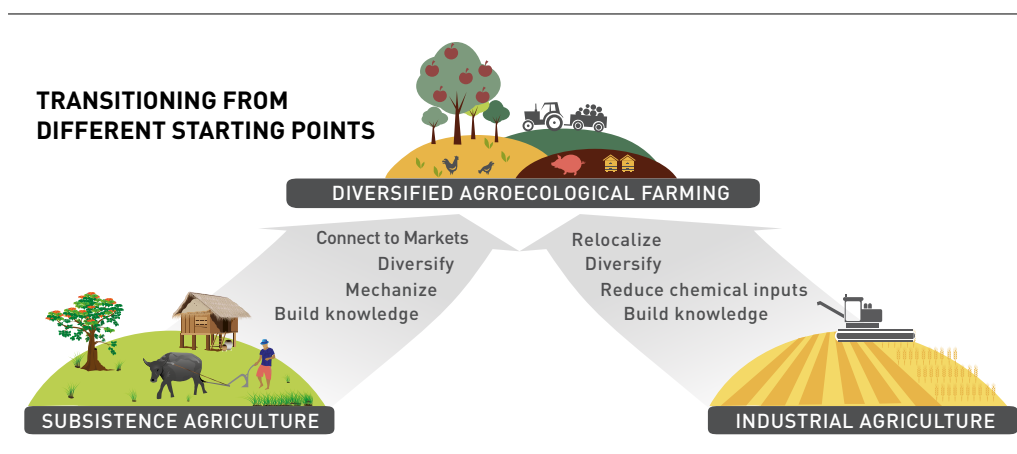
If the food system transformation we need could be summed up in a single word, it would be diversity. We need diversity in the field, within the farm, across the landscape, and throughout the economy. We need soil biodiversity, agrobiodiversity, wild biodiversity and dietary diversity. We need to value diverse forms of knowledge – or as Vandana Shiva put it, we must move beyond ‘monocultures of the mind’. In some ways, it is a journey back to the diversity that characterised agro-ecosystems prior to the advent of industrial agriculture. In other ways, it is a journey forward, drawing on cutting-edge knowledge to deliver highly productive, resilient, resource-efficient and multifunctional landscapes.

## Industrial agriculture – an existential threat to itself?

The challenges we face require no less. COVID-19 has affected one third of food and farming livelihoods. It has added 100 million people to the world’s hungry – who already numbered 750 million before the pandemic. In addition, two billion people suffer from micronutrient deficiencies and 1.9 billion are obese or overweight. Around the world, those facing poverty and malnutrition are often small-scale farming communities.

The environmental picture is bleaker still. More than half of the world’s farmland is degraded or severely degraded, and every year an area the size of the Philippines’ cultivated land is added to the list. Runoff from fertiliser is polluting groundwater and causing vast dead zones in estuaries. Over-use of antibiotics in industrial feedlots is accelerating the spread of antibiotic resistance – predicted to be a bigger killer than chronic diseases by mid-century. Food systems are responsible for as much as one third of global greenhouse gas emissions.

Perhaps most alarmingly of all, agriculture is responsible for 80 per cent of deforestation and 70 per cent of terrestrial biodiversity loss. Instead of nurturing the biodiversity it relies on to thrive, agriculture is helping to destroy it – and is therefore an existential threat to itself.



## How uniformity took over the world

It is worth recalling how we got here. Throughout history, humans have consumed over 7,000 species of plants as well as numerous animal species, most of them harvested from the wild. Over the last 10,000 years, a significant number of species have been domesticated and were part of diverse agricultural systems. But the 20<sup>th</sup> century saw a major reorganisation of production systems. As the ‘Green Revolution’ took hold around 50 years ago, food production systems were increasingly focused on a small number of staple crop varieties and animal breeds. They were designed for production in uniform, intensive, and highly-specialised systems. Rather than relying on diversity to keep soils healthy and mitigate risks, they opted for synthetic fertilisers, pesticides and antibiotics. While industrial food systems increased production, they have left a legacy of soil degradation, water and air pollution, greenhouse gas emissions and drastic biodiversity losses – while failing to end hunger and malnutrition.

## Time for a transformation

Over the last decade, it has become increasingly clear that this trajectory is not sustainable. A profound transformation – a new paradigm – is urgently needed. This is the conclusion of landmark reports from the Intergovernmental Panel on Climate Change, the Intergovern-

mental Science-Policy Platform on Biodiversity and Ecosystem Services, the High Level Panel on Food Security and Nutrition, and many others. Diversity is front and centre of these calls for food system transformation. This reflects the growing evidence from around the world of what diversity can achieve, from the soil microbiome to the plate:

- Soil biodiversity, including a wide diversity of microbes, arthropods and earthworms, is key to achieving healthy and productive soils via nitrogen fixation, nutrient mobilisation, organic matter decomposition and transformation in humus, soil texture improvement facilitating root penetration, water retention and carbon sequestration.
- Combining different species with different roots systems and nutritional requirements enables a better exploitation of soil nutrients and water and can take advantage of synergies, such as the combination of leguminous species and cereals in which the leguminous species fix more nitrogen than if grown in pure stands.
- Diverse mixed plant-animal farming and agroecological practices, such as legume intercropping and permanent soil cover, increase soil biodiversity and allow synthetic fertilisers to be replaced with locally-sourced organic fertilisers.
- A broad range of pollinating insects are necessary for food production. Almost 75 per cent of the world’s crops pro-



ducing fruits, vegetables and seeds for human consumption depend, at least in part, on pollinators for sustained production, yield and quality. Other parasitic or predatory insects as well as birds contribute to pest control.

■ Diverse fields and landscapes, combined with agroecological practices, re-establish natural pest and disease control systems that do not require pesticides. The use of complementary species in and around fields, such as in push-pull systems, allow for pest and weed management.

■ Diversified production systems provide for healthy, diverse diets. The reintroduction of neglected and underutilised species – especially those rich in vitamins, minerals, health-giving antioxidants and polyphenols, and other micronutrients – helps to re-diversify diets and improve the quality of nutrition in farming communities and beyond.

■ Diversification of production systems also diversifies sources of livelihood and builds resilience to shocks. Firstly, it decreases the vulnerability of farming households to commodity price volatility. Secondly, it also allows workload to be spread throughout the year and provides more stable employment. And thirdly, diverse production systems are more resilient to extreme weather events. For example, after Hurricane Mitch in 1998, the diverse fields of small-scale peasants in Honduras recovered much faster from the damage than the monoculture banana fields neighbouring them. And when Hurricane Ike hit Cuba in 2008, the losses on diversified farms were only half as bad as on neighbouring monocultures.

These approaches are mutually reinforcing. Diversity in the field breeds diversity in the ecosystems and landscapes surrounding them. There is a close correlation between the diversity of plants and the diversity and abundance of the soil microbiome and fauna. Re-introducing more biodiversity in landscapes, e.g. incorporating tree crops and other perennials, also brings back wild biodiversity in them.

### A unifying framework for food system transformation, with diversity at its core

Different terminologies are used to describe the transformation we need. But there is growing consensus that production systems must be redesigned and re-rooted in diversity. These

## PRINCIPLES TO GUIDE AGRICULTURE AND FOOD SYSTEMS TRANSFORMATION

1. **Recycling.** Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and biomass.
2. **Input reduction.** Reduce or eliminate dependency on purchased inputs and increase self-sufficiency.
3. **Soil health.** Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and enhancing soil biological activity.
4. **Animal health.** Ensure animal health and welfare.
5. **Biodiversity.** Maintain and enhance diversity of species, functional diversity and genetic resources and thereby maintain overall agroecosystem biodiversity in time and space at field, farm and landscape scales.
6. **Synergy.** Enhance positive ecological interaction, synergy, integration and complementarity among the elements of agroecosystems (animals, crops, trees, soil and water).
7. **Economic diversification.** Diversify on-farm incomes by ensuring that small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers.
8. **Co-creation of knowledge.** Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange.
9. **Social values and diets.** Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets.
10. **Fairness.** Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment and fair treatment of intellectual property rights.
11. **Connectivity.** Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies.
12. **Land and natural resource governance.** Strengthen institutional arrangements to improve, including the recognition and support of family farmers, smallholders and peasant food producers as sustainable managers of natural and genetic resources.
13. **Participation.** Encourage social organisation and greater participation in decision-making by food producers and consumers to support decentralised governance and local adaptive management of agricultural and food systems.

approaches are captured in the 13 Principles of agroecological transformation (see Box) identified by the High Level Panel on Food Security and Nutrition in 2019, building on the ten elements of agroecology previously adopted by the UN Food and Agriculture Organization (FAO). These principles can address all situations and all scales, but their practical application is location-specific and involves continuous co-innovation between farmers and scientists. These principles provide a unifying framework for all of those redesigning and re-diversifying their farming systems, whether they refer to themselves as agroecological, regenerative, organic, or permacultural.

Policymakers looking for ‘win-win-wins’ – for social, environmental and economic sustainability, or for animals, people and the planet – should look no further than diversified agroecological systems. This is the comprehensive response to industrial agriculture, and the way out of its vicious cycles. The benefits for biodiversity are obvious, but the potential for tackling climate change is no less dramatic: the combination of carbon sequestration in soils and diverse vegetation, including trees,

has the potential to transform our food systems from being the greatest greenhouse gas emitter to being carbon neutral. Indeed, diversified agroecological systems will deliver on virtually all of the Sustainable Development Goals (SDGs), and we must transition towards them, irrespective of whether the starting point is under-performing subsistence agriculture or unsustainable industrial agriculture.

In other words, it is time to stop seeing biodiversity as a necessary victim of food systems. Food system transformation starts and ends with diversity – and the time for transformation is now.

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“By 2030 protect and conserve through well connected and effective systems of protected areas and other effective conservation measures at least 30 per cent of the planet with the focus on areas particularly important for biodiversity,” the draft monitoring for the post-2020 global biodiversity framework demands. Opinions on this target are divided. In the following two articles, our authors sum up its pros and cons.

## Why conserving 30 per cent of the planet’s land and seas is critical – and how to achieve this

By Georg Schwede

In the negotiations for the new global biodiversity framework (GBF) to be adopted at the 15<sup>th</sup> Conference of the Parties (COP15), the current draft target two, calling for a significant increase in the extent of protected areas (PAs) and other effective conservation measures (OECMs), has received considerable public and political attention. Parties to the CBD, scientists, economists, NGOs, international organisations, Indigenous People and Local Communities (IPLCs), and other stakeholders are intensely engaged in the debate about extending the area managed for conservation to at least 30 per cent. Many see the current draft target “By 2030 protect and conserve through well connected and effective systems of PAs and OECMs at least 30 per cent of the planet with the focus on areas particularly important for biodiversity”, in short “30 by 30”, as a critical cornerstone of the new GBF.

For the advocates of “30 by 30”, there are four main reasons why adopting this target will be critical: curbing the loss of biodiversity, mitigating and adapting to climate change, providing essential ecosystem services and other economic benefits, and reducing the risk of future zoonotic diseases like COVID-19.

### The scientific arguments

To effectively address the intertwined crises of biodiversity loss and climate change, the scientific community is overwhelmingly supporting “30 by 30”, seeing 30 per cent as the floor and not the ceiling of what the world community has to agree on. A survey of 335 conservation scientists from 81 countries found “very strong support” for conserving even a larger percentage – “in the order of even 50 per cent” – of the planet. It further revealed strong agreement that the former Aichi target 11 of protecting at least 17 per cent of the world’s land and freshwater and 10 per cent of the ocean isn’t enough. To maximise biodiversity, climate and other benefits, scientists are also clear that “30 by 30” needs to be a global target al-



According to IPBES, habitat loss and degradation and overexploitation of the oceans are among the leading causes of global biodiversity loss.

Photo: David Mills/ WorldFish

lowing for a strategic focus on ecosystems of global significance for biodiversity conservation and the protection of critical carbon sinks.

In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) identified habitat loss and degradation and overexploitation of the oceans as the leading causes of biodiversity loss. In its recommendations to curb further loss, IPBES suggested to expand and effectively manage the current network of protected areas. This recommendation was echoed in the 5<sup>th</sup> Edition of the Global Biodiversity Outlook in 2020 calling for “major increases” in both the size and effectiveness of protected areas. A 2020 landmark paper in *Science Advances* stressed that by 2030, we need 30 per cent to be formally protected and an additional 20 per cent designated as climate stabilisation areas to stay below the 1.5°C global temperature increase and significantly reduce the loss of biodiversity. In October 2020, a UN report estimated

that protecting 30 per cent of land in strategic locations could safeguard more than 500 gigatons of carbon while reducing extinction risks of 88 per cent of the species considered. And finally, as part of its five key strategies to mitigate climate change, avert biodiversity loss and make global food systems more sustainable the German Advisory Council on Global Change recommended expanding protected areas to 30 per cent of the Earth’s land area.

### The socioeconomic arguments

The scientific arguments for adopting “30 by 30” have been underpinned by various economic studies. A 2020 report from the University of Cambridge documents that protecting 30 per cent of the world’s land and oceans provides greater benefits than the status quo, both in terms of financial outcomes and non-monetary measures like ecosystem services. It concludes that these benefits outweigh



the costs by a factor of at least 5:1. McKinsey recently completed an analysis of the economics of 30 per cent. The authors found that increasing protected areas to 30 per cent would safeguard 30 million jobs in ecotourism and sustainable fisheries, create 650,000 new jobs in conservation management and support 500 billion US dollars of GDP in ecotourism and sustainable fisheries.

The COVID-19 pandemic has brought home the global importance of one of the most critical services that healthy natural areas offer to humanity: a protection shield against the outbreak of new diseases. The IPBES *#PandemicsReport* looking at the links between pandemic risk and nature describes how the spill-over of new pathogens to humans can be reduced. Recommended measures included the conservation of protected areas and implementing policies limiting unsustainable exploitation of areas high in biodiversity. Another paper published in October 2020 found that effective and equitably managed networks of protected areas “can and should be part of the response to reduce the risk of future zoonotic pandemics”.

The compelling scientific and economic arguments for “30 by 30” have prompted international NGOs as well as a growing number of CBD parties to publicly commit their support of “30 by 30”. In a joint declaration international environmental NGOs, including Conservation International, WWF, The Nature Conservancy, BirdLife International, the Wildlife Conservation Society and others, are calling for “the effective protection and conservation of at least 30 per cent of both land and sea by 2030, including through protected areas and indigenous and community-led approaches”. At the intergovernmental level, more than

60 countries from across the globe have joined the High Ambition Coalition (HAC) for Nature and People. The HAC champions a global deal for nature and people with the central goal of protecting at least 30 per cent of the world’s land and oceans by 2030.

## Let’s talk about “how”

In a nutshell, for the supporters of “30 by 30”, the key question is not anymore “whether or not” but “how” it needs to be adopted. Among key aspects currently discussed in the CBD negotiations to address the “how” are qualitative, financial and social and human rights questions. Qualitative features need to ensure the prioritisation of areas most important for biodiversity conservation, climate change mitigation and reducing the risks of further zoonotic diseases. New sites have to be connected, integrated into the wider landscape and managed effectively to deliver their expected benefits for nature and people. Closely related to management effectiveness are financial aspects. Sustainable financing is the biggest challenge of ensuring management effectiveness, in particular in countries of the Global South. Recent estimates assume that managing an extended network of protected areas effectively, sustaining their delivery of biodiversity and ecosystem services benefits, including significant economic and financial contributions, will cost around 140 billion US dollars annually.

Social and human rights aspects are intrinsically connected to the question on priority geographical areas for “30 by 30”. There are approximately 476 million Indigenous People world-wide. Although they make up only six per cent of the global population, Indigenous Peoples inhabit approximately 85 per cent of

the areas proposed for biodiversity conservation. IPLCs conservation institutions and local governance regimes have been effective in preventing habitat loss, often more successful than traditional conservation approaches (for example the establishment of purely government-managed conservation areas without involving IPLCs and without these benefiting from possible monetary and non-monetary values). Expanding recognition of IPLC land tenure rights must be seen as an effective, moral and affordable solution for protecting our world and preventing rights violations that have plagued many traditional conservation strategies. Thus, the target of conserving at least 30 per cent of the planet’s land and oceans must explicitly underscore the need to protect Indigenous Peoples’ rights, ensuring free, prior and informed consent and alignment with the UN Declaration on the Rights of Indigenous Peoples (see following contribution by Friedrich Wulf).

It has never been more urgent to switch to a transformative path to solve the multiple intertwined crises that put our common future at risk, and it seems evident that the adoption of the “30 by 30” target is an important step which we must take now.

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## Why a 30 per cent blanket target on protected areas is not enough

By Friedrich Wulf

While the voices for a global “30 by 30” target are getting stronger, so are those raising concerns and asking questions. What do we mean by ‘protected areas’? Where should those protected areas come from? If it is true that these would cause ‘limited human impacts’, does this not increase the pressure on the remaining 70 per cent? And what does the designation of protected areas mean for the people who live there? Most areas are populated, however sparsely, and people depend on them for their livelihoods.

The last question certainly is of highest concern. For many, the quest for increasing their protected area networks relies on the conventional model, that of governance by government (via agencies and services at various levels, as is often the case for protected areas), implemented in some regions in an exclusionary manner which in practice involves or at least tolerates the use of coercion or even violence. People are being mistreated or killed and driven off their land which they previously used to nourish themselves, thereby being dispossessed

and driven into hunger and malnutrition. The model case quoted for this is the USA’s Yellowstone National Park, founded in 1872, after the establishment of which over three hundred native Americans were killed and several thousands displaced. According to a recent report of the Rights and Resources Initiative (RRI), a global coalition of more than 150 rightsholder organisations and their allies, between 1.65 billion and 1.87 billion Indigenous Peoples and Local Communities (IPLCs) live in important biodiversity conservation areas, 363 million of

whom inhabit existing protected areas – this illustrates the potential dimension of the issue.

### Aspiration and reality – experience from four continents

#### Example 1: Central Africa

A study published by Rainforest Foundation UK (RFUK) in 2016 looked at the impacts of setting up 34 protected areas in Central Africa (Cameroon, the Central African Republic, the Democratic Republic of the Congo, Gabon and the Republic of the Congo) on biodiversity and local inhabitants. It found that while poaching persisted and elephant, bongo, gorilla and chimpanzee populations were further declining, the creation of at least 26 of these 34 reserves resulted in partial or complete relocation or displacement, without any compensation, of local indigenous and farming communities present in the area prior to park establishment. Contrary to claims, there is no consultation or participation. Eco-guards hired by the organisations running the site do not shrink from brutal violence in enforcing their policies, and governments do not intervene. There is huge distrust on both sides, who consider each other as enemies and mutually ignore each other's situation. In some cases, people's deprivation of their traditional sources of food made it necessary for the World Food Programme to step in and help them. In another case, pygmy people were driven off their land and now are forced to live in a dreary camp and earn their living by poaching – just the opposite of what is intended.

This has led Civil Society organisations in the DRC to develop a position paper with demands for the global biodiversity framework. With regard to draft target 2 on protected areas, they highlight the need to prioritise community-conserved areas before conventional, government-run protected areas, to respect the principle of free prior and informed consent (FPIC) and to identify the possible consequences of a 30 per cent target on the subsistence of IPLCs and to evaluate their impact to compensate for the actions tolerated or made by states.

If solutions following these criteria are found, this would enable the local people to continue foraging in the forests, thereby reducing the pressure on biodiversity in areas outside. This is a key argument for establishing non-exclusive protected areas which has also been voiced by others. In addition, one could hold that the creation of protected areas will be much less of



Adivasi in a village in the Indian Federal State of Jharkhand fighting for their land rights.

Photos: Jörg Böhling

a burden on food production than land-grabbing activities for other countries' agrocommodities because protected areas often are established in regions which are less suitable for farming, e.g. mountainous regions, wetlands or areas with poor soils.

#### Example 2: India

India is home to 104 million 'Adivasi' or first inhabitants. Wherever biodiversity was protected, nurtured and used by them, it was taken over by colonial governments as a source of commercial revenue, and the alienation of IPLCs has been continued by post-independence governments too. IPLCs are treated as encroachers in nearly all of the forest areas in the country protected by law as Reserve Forests and Protected Forests, constituting about 21 per cent of India's area. Five per cent of the country is protected area run in an exclusive manner without involving the historical custodians of biodiversity.

#### Example 3: Brazil

In Brazil, Indigenous Peoples and other forest-dependent communities have advanced in creating indigenous lands as a category in the constitution. The government is obliged to demarcate these as well as extractive reserves (RESEX) for communities to remain in the forest and survive from non-timber forest products like oils, latex, etc., a result of social activist Chico Mendes' struggle in the 1980s. They face many challenges, but it is an important step forward.

There is consensus that Indigenous Territories (around 25–30 per cent of the Amazon) ensure forest protection as well as or even better than protected areas like national parks without people. And it is not just that the In-

igenous People depend on their territories, it is precisely their intrinsic (non-western) relation with nature which fosters sustainability within their habitat. These protected areas or Indigenous Territories close to the agricultural frontier often look like an oasis in the middle of destruction. However, they are increasingly under threat by the advance of destructive sectors (agribusiness, logging, mining and oil industries) who want to make profits from the forest areas, with the current Bolsonaro administration ensuring their impunity. This destruction is exacerbated by the complete lack of public policies to promote different uses of forests under control of the communities. A "30 by 30" target based on exclusive protection could be an incentive to halt the demarcation of indigenous lands, while still unthreatened lands could be declared exclusive protected areas involving eviction of the Indigenous People there.

#### Example 4: Europe

The situation in Europe is different. Protected areas, as diverse as they may be, usually are not exclusive, although rejection of protected areas by local people and public decision-makers in general is not uncommon. Other effective conservation measures including Indigenous and community conserved areas (ICCAs) are getting more recognition in the European Union, too. However, despite diverse subsidies being available to landowners, there still are numerous implementation gaps in protected areas, and many species continue to be threatened. Experts agree that a much bigger effort from Member States would be needed to achieve good management of all areas than merely extending the protected area network from the current 25.7 to 30 per cent.





Indigenous Territories in the Brazilian Amazon are increasingly under threat by the advance of sectors seeking to make a profit in the forest areas.

## So what can be done?

A “30 by 30” protected area target is seen both as a necessity to save the world’s biodiversity (see previous contribution by Georg Schwede) as well as a threat to human rights and biodiversity inside and outside of protected areas. While for some this leads to the issue of not setting a percentage target on protected areas, others, such as the Rights and Resources initiative, suggest the problems raised can be resolved by adapting the global target to ensure that respect for local people’s land rights be a prerequisite for any new conserved area. Either way, the following must be addressed:

- Any site designation and management process must be the result of an equitable, inclusive and fair process with the consent of local rightsholders and consultation with other people concerned, based on a thorough prior impact assessment.
- All four types of governance of conserved areas need to be included in the future target: by government (i.e. classical protected areas), by various actors together, by private actors and by IPLCs.
- Areas governed and managed by IPLCs offer a huge contribution to conserving nature. They include community forests and ‘territories of life’ (also known as IC-CAs) in biodiversity-rich areas. In order to be fully counted towards any “30 by 30” target, they should be properly recognised and supported by state governments, in particular by securing governance and tenure for their custodians.
- The management of all protected areas must be closely monitored, not only in terms of efficiency, but very importantly regarding full compliance with all human

rights, including those laid down in the UN Declaration on the Rights of Indigenous Peoples (UNDRIP). If there is a protected area target in the new global biodiversity framework, it needs to be monitored through a headline indicator on compliance with human rights. Headline indicators are indicators required from all countries to monitor implementation of the post-2020 global biodiversity framework, according to current draft proposals. Areas which cannot demonstrate that they comply should not be counted towards a protected area target.

- A globally agreed target needs to come with teeth to enforce it, such as a grievance mechanism which enables rightsholders and IPLCs to demand justice in case their rights are disregarded. The Global Assessment Report by the IPBES sees justice and inclusion in conservation as a key leverage point for a transformation towards sustainability.

These demands are not new but are deeply rooted in the Convention on Biological Diversity (CBD). In 2000, it embraced the ecosystem approach, a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The Programme of Work on protected areas (POWPA), in its element 2, has set detailed targets to promote equity and benefit-sharing and enhance and secure involvement of indigenous and local communities and relevant stakeholders in governing protected areas. An encouraging step in this direction currently has been announced by the US government, although the USA is not a member of the CBD. The “America the beautiful” initiative aims to reach its “30

by 30” target by redefining what constitutes “conserved” land, to make that new definition distinct from, and more comprehensive than, “protected” land, to respect the rights and sovereignty of tribes, and to position local communities and tribal nations as the primary actors to reach that target.

As this article shows, equity and various forms of governance for protected and conserved areas are key for a new “30 by 30” target. But they are not the only aspects that need to be clearly addressed in the new CBD target on protected areas. All the elements contained in the still valid Aichi target 11 need to be reflected in the new one as well:

- Representativeness is crucial to ensure that areas of particular importance for biodiversity are included and not just the “easiest to get” areas.
- The areas need to be effectively managed, so that they deliver the conservation outcomes for which they were designated.
- The areas need to be well-connected, so that species populations are not isolated.

It is to be hoped that the new global biodiversity framework will take heed of this advice and the concerns currently voiced at the CBD-related meetings, and that the target on protected areas includes all these elements so that it serves both nature and people. Finally, protected areas are only one element of the CBD and the global biodiversity framework, which must respect the rights of IPLCs throughout (including in target 20) and also address biodiversity loss outside of protected areas, through sustainable use and by reducing the pressure created by the drivers of biodiversity loss.

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## Connecting people and nature – UNESCO biosphere reserves in Ghana

Biosphere Reserves are increasingly being recognised as special sites for people and nature. They bring together stakeholders and provide opportunities to dialogue, share ideas and expertise, and join hands to conserve biodiversity while enhancing community welfare and initiatives. This article showcases Ghana's experience with the biosphere reserve concept with a focus on Bia Biosphere Reserve.

By Sheila Nana Akua Ashong

Local communities in Africa depend heavily on biodiversity for their livelihoods, such as subsistence agriculture, fishing, hunting and the extraction and processing of non-timber forest products like snails, honey and medicinal plants. Due to a higher population growth rate in such areas as compared to urban areas, there is a tendency to overexploit resources from forests, mountains, wetlands and other vital ecosystems to meet human needs without considering the ability of the natural resources to recover.

The introduction of protection regimes in many countries, especially in Africa, initially faced challenges with resource depletion and loss of biodiversity because it was often done without due consideration of local community needs, leading to animosity among individuals and communities, and between communities and authorities responsible for protected areas. Protection regimes must consider sustainable development principles, ensuring the establishment and maintenance of balance between conserving natural resources on the one hand and communities using these resources on the other, without compromising nature's ability to sustain itself. Biosphere Reserves demonstrate this approach as a viable solution for a harmonic coexistence between human populations and nature.

### One network, one vision, one world – UNESCO Biosphere Reserves

UNESCO Biosphere Reserves (BRs) are terrestrial or coastal sites that provide opportunities to reconcile the conservation of biodiversity with its sustainable use. They are designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) to model innovative approaches to attaining the Sustainable Development Goals (SDGs). The World Network of Biosphere Reserves (WNBR), introduced through the Man and the Biosphere Programme (MAB) 50 years ago, is an interactive and dynamic network that fosters the harmonious integration of people and nature. It combines various forms of knowledge, providing opportunities for joint learning across different sites in different countries and regions. The WNBR with a current membership of 714 sites in 129 countries, including 21 sites shared by two or more countries or continents, has been recognised as a major tool to be used for attaining the Sustainable Development Goals (SDGs). The biosphere reserve concept draws strength from its integration of diverse knowledge and diverse stakeholder networks and principles across several international conventions and programmes.

Biosphere reserves are designed to go beyond conserving biodiversity to address and place emphasis on community well-being. Hence, they serve three mutually reinforcing and equally important functions:

- conservation of genes, species, landscape, and cultural and ecosystem diversity;
- socio-economic development: providing essential benefits such as livelihoods, food and fodder, and cultural values to human communities;
- logistic support meaning research, monitoring and education.

To fulfil these functions, BRs are characterised by three interactive zones:

- the core area, which is strictly protected from all human activity except for research;
- the buffer zone, where human activity which is compatible with conservation goals is allowed, such as research laboratories;
- the outermost transition area, where communities live and benefit from the resources while ensuring sustainable practices.

BRs differ from other nature reserves based on the emphasis they place on human welfare as compared to previous ways of conserving re-

Giant African snails found in Bia BR.

Photo: Sheila Nana Akua Ashong





sources that did not adequately consider community needs. The participatory approach is used in BRs to foster community empowerment to support conservation. Also, they provide opportunities for different stakeholders to combine knowledge for innovation and to learn sustainable development together.

Biosphere reserves facilitate the orientation or reorientation of stakeholders towards nature conservation with and through people and are emulated in many nature reserves. By combining all knowledge sources and bringing on board diverse stakeholder groups, management problems have been resolved more expediently. The joint learning and experiential sharing within the WNBR and its sub-networks have enhanced the capacities of local populations and their stakeholders through exchanges, educational programmes for children and youth, implementation of community initiatives to sustainable development and the integration of traditional knowledge concepts into conservation. Local populations are able to interact with their counterparts in other regions managing similar or different resources to learn from their experiences and seek common solutions. BRs also promote peace between populations in different countries through joint plans and programmes used to manage shared ecosystems.

### Ghana's story so far: the example of Bia Biosphere Reserve

Bia Biosphere Reserve lies in Ghana's transition zone between the moist evergreen and moist semi-deciduous forest in the country's southwest, along the border with la Côte d'Ivoire (see Map on page 22). The core area is made up of the Bia Conservation Area (Bia National Park and Bia Resource Reserve) and the "Apaaso" sacred grove, which is a sacred site visited only for prayers and sacrifice. The buffer zone is made up of degraded neighbouring forest reserves organised into community resource management areas and some communities, while the transition area comprises about 30 communities. The reserve is estimated to have a total population of 65,000, with about half living below the national daily minimum wage of 2 USD. It is managed by the Wildlife Division of the Forestry Commission in collaboration with the Community Resource Management Area (CREMA) committees and the Advisory Board. Communities are known to embrace the CREMAs because responsibility for management of the resources is devolved to them by the Wildlife Division, thereby increasing their sense of ownership.

The Bia BR is known to have some of the country's tallest trees, such as *Pericopsis elata* and *Khaya anthotheca*. It also serves as a refuge for many important animal species. These include 34 species of mammals such as the African elephant (*Loxodonta africana*), chimpanzee (*Pan troglodytes verus*), olive colobus monkey (*Procolobus verus*) and Geoffroy's Pied Colobus (*Colobus vellerosus*). There are also 60 species of birds such as the common bulbul (*Pycnonotus barbatus*) and the great white heron (*Egretta alba*), invertebrates like the giant African snail (*Achatina achatina*) and 40 species of *Pericopsis elata* butterflies including the citrus swallowtail (*Papilio demodocus*). Protecting these species contributes to achieving SDGs 13, 14 and 15.

In terms of fulfilling the development function (SDGs 1, 2 and 3), communities are engaged in agriculture (chiefly cocoa, Ghana's main cash crop), vegetable, fruit and other food crop farming, while some revenue is also generated from tourist visits to the national park and trading. The forest provides numerous medicinal plants used by the communities.

Several initiatives have been implemented by various stakeholders to address previous community animosity and perception of marginalisation relating to delineation of the national park. Two such initiatives emulating the benefits derived from being a part of the WNBR for Bia BR are UNESCO's "Biosphere Reserves for Biodiversity Conservation and Sustainable Development in Anglophone Africa" (BRAAF) project, implemented in five forest ecosystems in Ghana, Nigeria, Tanzania, Kenya and Uganda from 1995 to 1997, and "Green Economy in Biosphere Reserve" (GEBR) project, implemented from 2013 to 2017 in three forest ecosystems in Ghana, Nigeria and Tanzania. Through the BRAAF project, communities were reoriented through capacity building, sensitisation and supplementary livelihood initiatives like snail farming, oyster mushroom production, grasscutter rearing and bee keeping to understand and support conservation. Recommendations were also made for creating a shared elephant migration corridor with la Côte d'Ivoire. The GEBR project built on this foundation to reduce poverty by diversifying the local economy through bee-keeping, mushroom rearing, palm oil production, business management and snail rearing (with 220 persons trained and set up in business). The beneficiaries were also trained in business and financial management while ensuring women's empowerment (40 per cent



Cocoa farming in the transition area of Bia BR.



Farmers in Bia harvesting honey on their farm.

Photos: Dominic Awukuvie

of the beneficiaries). With all these initiatives, Bia is contributing to achieving SDGs 1, 5, 8, 11, 13, 14, 15 and 16.

Concerning its logistic function, Bia is a research site for national universities and international researchers on culture, chimpanzees, elephants, butterflies, cocoa production and soil organisms. There is a vibrant schools and community education programme (active before COVID-19) to facilitate behavioural change in the youth for sustainable development. Several studies have been conducted under the MAB Young Scientists award on snails, mushrooms and the River Bia.

### Lessons learnt and remaining challenges

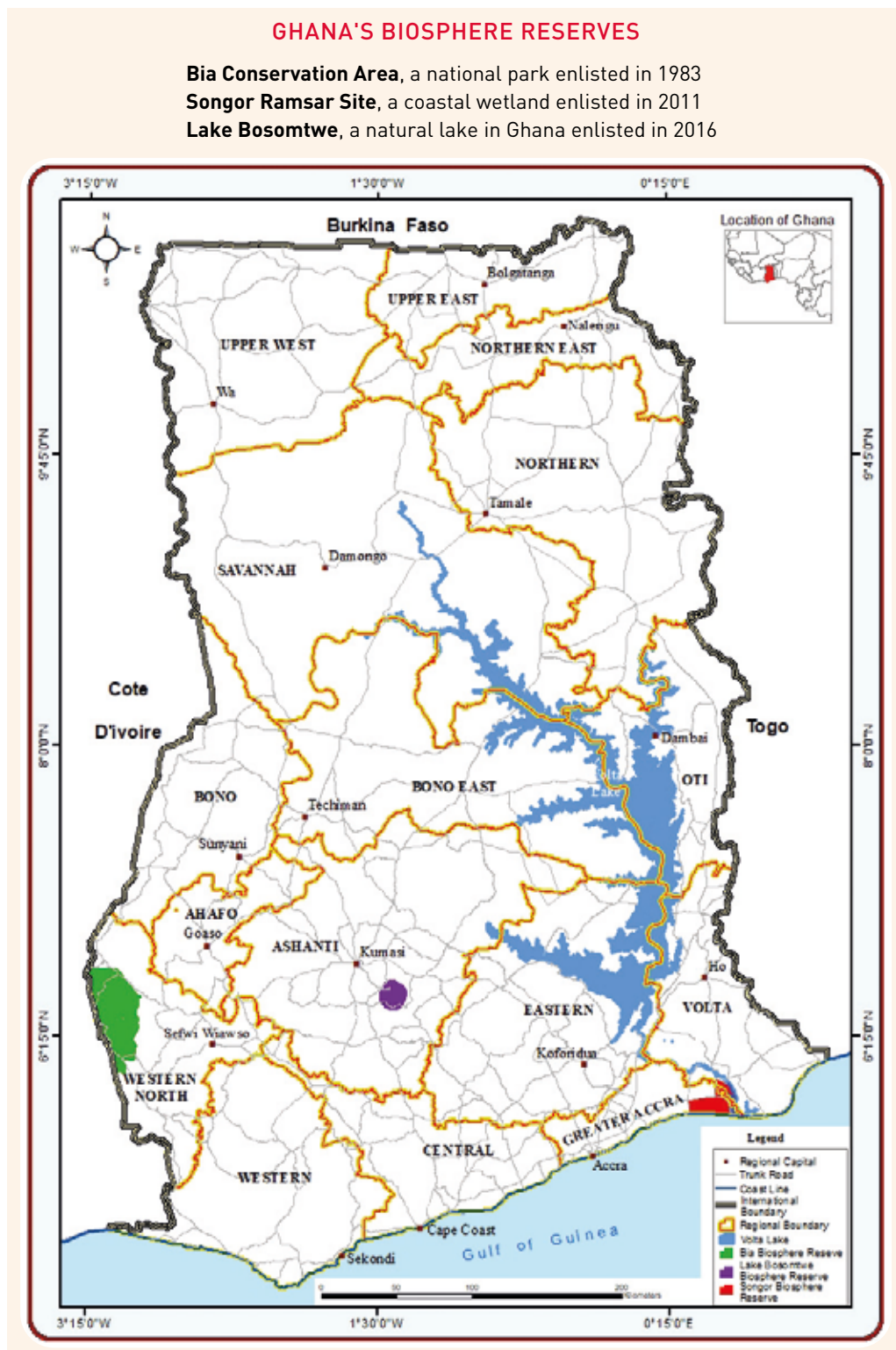
For people in Bia, membership of the WNBR has provided increased visibility and opportunities to share experiences with counterparts

locally, nationally and internationally for the common good. The BR has hosted delegations from Scotland, Senegal, Nigeria, Tanzania and other countries on joint projects. Most significantly, communities are now more involved, better oriented and collaborating with the management authorities. Based on previous recommendations from the BRAAF project, a GEF/FAO project was implemented which led to the preparation of a joint management plan for the Bia-Diambakro forest corridor to be implemented by the Forest Services and Wildlife Divisions of the Forestry Commission in Ghana and the Société de Développement des Forêts (SODEFOR) and national parks service (OIPR) in Côte d'Ivoire. Additional CREMAs have been demarcated to manage the forest resources in the transition area.

The key lesson reiterated by the communities is that challenges which they face in natural resource management and sustainable development are not unique but common to other communities across the world. However, as our elders say: "Two heads are always better than one." It is therefore more expedient to confer with others when solving problems. Stakeholder collaboration and partnership (SDG 17) is essential for the attainment of all the other SDGs, and biosphere reserves play a fundamental role in bringing stakeholders together to deepen our relationship with nature.

### Moving forward

Of course the management of the Bia Reserve also entails challenges, of which human-wildlife conflicts, where elephants sometimes raid cocoa farms, degradation of the forest reserves in the transition area zones for farmland, inadequate government financing and poaching are among the most important ones. To address these challenges, bee-keeping on farms and the use of the pepper-grease method is encouraged to deter elephants. The various projects, especially the National REDD+ Programme, have supported enrichment planting in degraded forest areas while general stakeholder collaboration has been deepened to improve law enforcement and local awareness on the zonation. Through collaboration with the National Development Planning Commission (NDPC), which started in 2017 to mainstream the BR concept in development planning, the MAB National committee is set to publish a handbook to guide district officers to ensure increased government allocation of financial resources for BR activities during the preparation of medium-term plans for 2022–2025. The biennial National Forum on BRs and



Sustainable Development, introduced in 2018 to enhance awareness on the BR concept, will continue to be used as a platform for networking and sharing.

The BR concept has been of immense benefit to local populations in Bia, the region and the nation as a whole. In the anniversary year of the MAB Programme, consensus building is expected to be enhanced for optimal stakeholder support to make Bia a site of excellence for learning sustainability.

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# Facts and figures on biodiversity and ecosystem services

## The worrying ones ...

- World-wide, out of an estimated eight million animal and plant species, one million are threatened with extinction.
- 75 per cent of terrestrial ecosystems and 40 per cent of marine ecosystems have already suffered severe anthropogenic changes.
- Since 1990, world-wide, 420 million hectares of forest area has gone lost.
- Each year, human activities cause the destruction of around 13 million hectares of forest.
- Each year, the world loses 6.3 trillion US dollars worth of ecological services through forest and land degradation.
- Loss of pollinators threatens global crop outputs worth between 235 and 577 billion US dollars annually.
- Maintaining current living standards would require 1.6 Earths.
- 33 per cent of all fish stocks are over-fished.

## The neutral ones ...

- 80 per cent of all species world-wide live on just 20 per cent of the Earth's surface.
- Forests are home to more than 80 per cent of biodiversity.
- More than two billion people rely on wood fuel to meet their primary energy needs.
- More than 75 per cent of global food crop types, including fruits and vegetables and some of the most important cash crops, rely on animal pollination.
- Over half of the world's gross domestic product (GDP) is highly dependent on nature and its services.
- About a third of the GDP in India and Indonesia and 23 per cent of the GDP in African countries is generated in nature-dependent sectors.
- 25 per cent of drugs used in modern medicine are derived from rainforest plants.
- At least a quarter of the global land area is traditionally owned, managed, used or occupied by indigenous peoples. These areas include approximately 35 per cent of the area that is formally protected, and around 35 per cent of all remaining terrestrial areas with very low human intervention.
- The conserving of 30 per cent of the planet's land and sea would cost 140 billion US dollars, which is equivalent to 0.16 per cent of global GDP.
- Protected areas store 20 per cent of terrestrially sequestered carbon.
- World-wide, around 85 billion US dollars is spent annually on the conservation of biological diversity.
- Oceans produce 50 per cent of our oxygen and absorb more than 90 per cent of greenhouse gas heat.

## The promising ones ...

- The rate of deforestation has been reduced by around a third compared to the previous decade.
- Between 2000 and 2020, terrestrial areas under protection grew from 10 to over 16 per cent, marine protected areas rose from 3 to over 7 per cent, and the conservation of key biodiversity areas grew from 29 to 44 per cent.
- The Nagoya Protocol, which regulates access to genetic resources and a balanced and fair sharing of the advantages resulting from their use, is being applied in at least 87 countries.
- International financing of biodiversity conservation doubled between 2010 and 2020.



## Biodiversity and agriculture – rivalry or a new friendship?

Like agriculture and climate change, agriculture and biodiversity, and hence food security, are interconnected in both a negative and a positive sense. In this article, our author describes what we know about the links, what role the agricultural sectors have to play in the sustainable use and conservation of biodiversity and what the transition of agricultural systems which this requires could look like in small-scale and in large-scale production.

By Irene Hoffmann

Biodiversity plays a crucial role in achieving food security and nutrition for all. Biodiversity also provides regulating and supporting ecosystem services for agriculture, including nutrient cycling, soil formation and rehabilitation, as well as habitats for wild species, biological pest control and pollination. Biodiversity makes production systems and livelihoods more resilient to shocks and stresses, including the effects of climate change. But despite global efforts spanning several decades, biodiversity continues to be eroded; in their 2019 publications, the Food and Agriculture Organization (FAO) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) provide evidence that many of the drivers that have negative impacts on biodiversity are at least partly caused by inappropriate agricultural practices.

Without changes in production and consumption patterns and reductions in food waste and losses, the agricultural sectors will struggle to meet future food demands. As demand grows, the role of the agricultural sectors in the sustainable use and conservation of biodiversity will become even more significant. Regarding biodiversity and food security, food system and sustainable agricultural transitions are part of a larger debate on the role of farm size in global food security, biodiversity and landscape fragmentation as well as land-sharing versus land-sparing, and have most recently been addressed in the development of the post-2020 global biodiversity framework.

The following focuses on terrestrial (mostly crop production) systems, despite the important role of biodiversity and its management in marine and coastal ecosystems and inland waters, and the diverse roles of livestock across many ecosystems.

### Biodiversity on which land?

Going back in history, humans have shaped the planet for more than 12,000 years. Therefore, current biodiversity losses are caused not only by anthropogenic degradation of un-



For smallholders, biodiversity conservation must be linked to food security and livelihood improvements.

Photo: FAO/ Luis Tato

touched “natural” ecosystems, but also, and indeed mainly, by changes in the intensity of land already modified. Many of the most biodiverse areas remaining on the planet are forests or drylands, covering about one third of the terrestrial area; they are often managed by indigenous peoples under traditional low-intensity systems, including hunting and gathering. Roughly another third of the land area is too cold or dry for permanent human use, or is covered by extensive shrub- and rangelands.

Agricultural land accounts for more than one third of the terrestrial area. It includes diverse cultural landscapes with dynamic and productive mosaics of ecological communities in varying states of succession, and cultural modifications have been continued or maintained over millennia in many regions, often in smallholder systems, where a wealth of biodiversity for food and agriculture was developed and conserved. At least a quarter of the global land area is traditionally occupied and used or managed by indigenous peoples, and in these areas,

biodiversity is generally declining less rapidly than elsewhere.

### Biodiversity-friendly practices and diverse landscapes as parts of the solution

In the next decade, the agricultural sectors – including crop and livestock production, forestry, fisheries and aquaculture – need to rapidly upscale the best practices identified for managing biodiversity for food and agriculture and for halting the loss of biodiversity within and outside of agricultural systems. FAO country reports on The State of the World’s Biodiversity for Food and Agriculture show that the use of a wide range of management practices and approaches regarded as favourable for the sustainable use and conservation of biodiversity for food and agriculture at landscape, farm and field level, such as landscape management and ecosystem approaches, agroforestry or sustainable soil management, is increasing. However, it is difficult to evaluate



the extent to which these approaches are being implemented. This is firstly because, especially in smallholder systems, many biodiversity-focused practices are relatively complex and can be knowledge-intensive, and are context and location specific and secondly because few appropriate assessment methods and cause-effect relationships have been demonstrated, while benefits of practices materialise only in the relatively long term.

There is an ongoing discussion about the impact of practices versus farm or plot size on biodiversity. The FAO report shows that agricultural landscapes can provide habitats for biodiversity and promote connectivity between protected areas and other biodiverse areas.

Farm holding and field size – though different – are dimensions of landscape heterogeneity, since small-scale agricultural systems with high-field border density, buffer strips, hedges and trees provide habitats and can boost associated biodiversity (e.g. pollinators, natural enemies of pests). This is where smallholders come into the game. Globally, smallholder farms under two hectares represent 84 per cent of all farms and occupy around 12 per cent of the global farmland; they were found to harbour greater crop and non-crop biodiversity at the farm and landscape scales compared to larger farms, as a recent publication in *Nature Sustainability* has shown. Very small fields sizes have a substantial share in the total agriculture of Asia and Africa, but play a smaller role in Western Europe, while large fields dominate in post-Soviet Union countries, the USA, Brazil, Australia, Argentina and Canada. According to the June 2021 issue of *World Development*, large farms of more than 50 hectares represent one per cent of all farms but occupy 70 per cent of farmland.

### What agricultural systems transition should look like

Hunger and poverty are most widespread in rural and smallholder settings in developing countries, where the diversity of food consumed is often low. Smallholder farm systems, when faced with population growth and continued poverty can result in increased biodiversity loss, including through cropland expansion into forests that harbour large parts of wild biodiversity. Local subsistence agriculture accounted for 33 per cent of deforestation in the tropics and subtropics over the 2000–2010 period. Expansion also happens in the commercial sectors: large-scale commercial agriculture accounted for about 40 per cent of

deforestation in the tropics and subtropics over the same period and 70 per cent of the deforestation in Latin America.

In more intensive large-scale systems, agri-environmental policies should aim at reducing field sizes and the share of crops under particularly intensive management while simultaneously promoting diversification. In less biodiverse regions and low-external input farming systems, intensification is an option for closing production yield gaps without necessarily causing additional decline in biodiversity. This can be achieved through improved nutrient, water and pest/ disease management, and innovative approaches such as precision or climate-smart agriculture; however, care has to be taken to not create threats to traditional genetic resources for food and agriculture and wild species depending on extensively managed landscapes.

Agriculture can impact biodiversity but the intensity and extent to which this happens depends on biodiversity richness, abundance and endemism in and surrounding the intensified area or farm. Even when agricultural expansion and intensification has already occurred, there are ways to enhance ecosystem services or increase productivity through a range of biodiversity-friendly practices and approaches, as indicated above. Where productive ecosystems are degraded, they have to be restored to their productive potential.

### Targeting agricultural stakeholders for sustainable use, conservation and restoration of biodiversity

Policy-makers need to balance decisions involving land use for biodiversity conservation and agricultural production, taking into account needs of stakeholders, and identify hotspots of biodiversity as well as potential future conflicts and loss of environmental and societal resilience.

Smallholders are both food producers and stewards of biodiversity. While smallholders' globally managed land area is small, their numbers are collectively large and their contribution to food security is significant. However, rural poverty rates are high. For this group, which has been neglected by R&D and extension services in many low- and middle-income countries, biodiversity conservation must be linked to food security and livelihood improvements. Such links could be rewarding smallholders for their conservation benefits towards genetic resources for food and agri-

culture and associated and “wild” biodiversity (e.g. pollinators), and improving market access through public procurement schemes for biodiversity-friendly production methods or specialty markets for traditional foods with higher prices. Policies also need to ensure that agricultural intensification does not lead to reductions in genetic diversity for food and agriculture, and that investments and policy incentives promote diversified agriculture, health and well-being.

The global land area managed by farmers who are not smallholders is significantly larger, and this group, thanks to their relatively lower numbers and often better organisation, are potentially easier to target than local networks of smallholders. Biodiversity-friendly practices need to be up-scaled and promoted through capacity development and strengthening policy frameworks. Biodiversity can be promoted on larger farms by stimulating more biodiversity-friendly management practices, especially reducing the use of pesticides and more effectively using fertilisers, and increasing habitats such as buffer strips, hedges and trees. These farmers operate in the formal sector of the economy where regulation, taxes and incentives take hold. They are also often linked to global value chains, where consumer pressure, government commitments and corporate standards involving zero-deforestation and eco-labelling bring about change. Ecosystem accounting at national and corporate levels and innovative investment could further enhance the links between conservation and production.

Nature cannot afford to rival agriculture. Dual goals of conserving biodiversity while increasing the efficiency and yield of food production can be simultaneously achieved through acknowledging and valuing the full contribution of nature to agricultural systems and engaging with all stakeholders at all levels. Political will and multistakeholder action are key.

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*The views expressed in this publication are those of the author and do not necessarily reflect the views or policies of the Food and Agriculture Organization of the United Nations.*



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## “ We must thoroughly change how we use our land and seas ”

Biodiversity is a core issue of German development cooperation. Parliamentary State Secretary Maria Flachsbarth on achievements, lessons learnt and remaining challenges.

**Ms Flachsbarth, with the Strategic Plan for Biodiversity 2011–2020 adopted in Nagoya, Japan, in October 2010, governments opted for halting the loss of biodiversity on our planet. However, the latest UN Global Biodiversity Outlook presents a rather gloomy picture. Isn't the world taking the conservation of biodiversity seriously enough?**

The IPBES report on the global state of biological diversity has confirmed that our present efforts to conserve biodiversity are not sufficient to secure our natural basis of life in the long term. Of course this is not good performance. Even so, we can also present success, as the Global Biodiversity Outlook 5 demonstrates.

**What exactly does this success look like?**

For example, world-wide, the rate of deforestation has been reduced by around a third compared to the previous decade – this relates to Aichi Target 5. Regarding Target 6, in areas with good fisheries management, marine fish stocks were maintained or restored. Progress has also been made concerning Targets 11 and 12. Between 2000 and 2020, terrestrial areas under protection grew from 10 to over 16 per cent, and marine protected areas rose from 3 to over 7 per cent, while the conservation of key biodiversity areas grew from 29 to 44 per cent. And thanks to conservation measures such as the designation of protected areas, hunting restrictions, the control of invasive species alien to certain areas, ex-situ conservation and the reintroduction of species, we have managed to reduce the number of species threatened by extinction. Without these measures, extinction levels of birds and mammals in the last ten years would probably have been two to four times higher.

Another achievement is that the Nagoya Protocol, which regulates access to genetic resources and a balanced and fair sharing of the advantages resulting from their use, has come into force. It is now being applied in at least 87 countries. And international financing of biodiversity conservation was doubled between 2011 and 2020. Thus we have also made progress with Targets 16 and 20.

**Do we know more today about the significance of biodiversity than we did nearly 30 years ago, when the United Nations adopted the Convention on Biological Diversity?**

We have indeed learnt a lot about nature conservation over the last 30 years. Based on the Convention, we have intensified cooperation world-wide. We have developed many methods and tools and tested them successfully, and have gathered experience in implementing measures to conserve biodiversity, especially regarding how these can be effectively and inclusively designed and offer benefits both for humans and for nature. Thanks to progress in science, we also know more and more about the interaction at local level between ecosystems and species and genetic biodiversity as well as global interrelations between biodiversity, climate and health, and can use these insights to make decisions and steer processes. Thus we know too that in addition to protecting ecosystems, we must thoroughly change how we use our land and seas. What is lacking is a consistent implementation by all actors.

**Has the corona pandemic acted as a wake-up call in this respect?**

The pandemic has once again shown how vulnerable we humans are and what direct impacts destroying nature has on us as humans – both regarding our health and well-being and economically. Biodiversity and health are closely linked, and most new infectious diseases, including COVID-19, are zoonoses. We have been shown clearly that preventing the development and spreading of new diseases requires protecting nature. This is why we have been making even more efforts to give biodiversity conservation more attention since the onset of the COVID-19 pandemic.

With the International Alliance against Health Risks in the Trade of Wildlife and their Products, together with the German Federal Ministry of Environment (BMU) and other partners, we have created a communication platform to promote international dialogue, sharing expertise among various actors and significantly reducing certain health hazards arising from legal and illegal trade in and consumption of wildlife.



In future, this will improve the prevention of zoonoses while at the same time contributing to biological diversity.

**This year, your Ministry is backing the conservation of biodiversity with 600 million euros. What exactly is this money being used for?**

Via government financial and/ or technical bilateral cooperation, the BMZ is supporting the protection of 668 areas in 80 countries comprising an overall surface of more than two million square kilometres, six times the size of Germany. We are also assisting our partner countries in considering the triad of conservation, sustainable use and fair benefit sharing and combining the conservation of biodiversity with economic development and mitigating and adapting to climate change.

**Could you give some examples?**

With the programme “Kavango-Zambezi Transfrontier Conservation Area (KaZa)”, for instance, we are supporting Angola, Botswana, Namibia, Zambia and Zimbabwe in linking up their national conservation areas via the largest terrestrial, cross-border conservation area world-wide. For this purpose, the BMZ has so far provided more than 35 million euros. By building up endowment capital, the Legacy Landscapes Fund, launched in May 2021 and kick-started by Germany with a contribution of 82.5 million euros, creates long-term financial security for protected areas in developing countries and newly emerging economies which are of outstanding significance in terms of global biodiversity. Here, public finance leverages private (philanthropic) funds at a rate of 2:1. And the Blue Action Fund, started in 2016 by the BMZ and KfW Entwicklungsbank, is now one of the largest funds world-wide addressing marine conservation. It supports NGOs developing the extent and quality of marine conservation areas. With the initiative “MeerWissen”, evidence-based political decisions are backed via German-African research partnerships. And we support the international initiative “Save Our Mangroves Now!” run by the World Wide Fund For Nature (WWF) and the International Union for Conservation of Nature (IUCN). This initiative mobilises political decision-makers and seeks to halt the loss of mangrove forests.

**You also mentioned support for policies that foster sustainable use of resources and fair benefit sharing ...**

Examples here include the multi-donor initiative on ABS – Access and Benefit Sharing Capacity Development with Norway, Switzerland and the European Union, and the Initiative

BioInnovation Africa. Within these initiatives, fair framework conditions for the distribution of profits from genetic resources are being promoted, and European-African business partnerships are being developed for fair and sustainable value chains for products with natural ingredients. By 2022, this is to create more than 10,000 hectares of areas used under consideration of conserving biodiversity as well as several thousand additional sustainable jobs at local level. Another example is the eco.Business Fund Africa, set up to finance and support resource-efficient and biodiversity-friendly forms of production. It addresses financing partners as well as, directly, businesses in developing countries and emerging economies.

We are aware that we can only cope with the enormous challenges by working together. All contracting states have to raise their efforts. We are supporting our partner countries in this context. In addition, we are seeking to get stronger commitment on the part of the private sector. Global supply chains have to be conceived with a view to conserving biodiversity, and finance flows must no longer be channelled into measures harming biodiversity.

**But despite all our knowledge, intact ecosystems continue to suffer destruction on a massive scale. For example, human activities destroy around 13 million hectares of forest each year. Partner countries in German development cooperation are affected too. How do you get your local political partners to rethink their approaches?**

Nature is being destroyed in several of our partner countries. That is why we are supporting them in implementing their biodiversity targets. In politically difficult times, too, we seek to work out ways together with them aimed at not losing sight of the biodiversity targets. We have a wide range of tools for this purpose which are applied at all political levels and among a diversity of actors. However, the destruction of nature always also has a lot to do with our behaviour as consumers here in the Global North. Much of the food sold in Germany comes from, or is based on, primary products from countries with a high level of biodiversity. We have to address this too if we wish to tackle the drivers of biodiversity loss. We have to rid our supply chains of deforestation and make them more sustainable, and we have to use nature in a sustainable way.

**The policy paper on the conservation of biodiversity which your Ministry issued in October 2020 is titled “Investing in Biodiversity – A Matter of Survival”.**

**It demonstrates that biodiversity loss is also jeopardising the achievement of the 17 Sustainable Development Goals. 2030 isn't that long off. What must happen to turn the tide?**

We must urgently agree on a new, ambitious global biodiversity framework which we can then swiftly and reliably implement, and which genuinely reverses the trend. Various aspects need fine-tuning to achieve this. First of all, we must significantly increase investment in the conservation of biodiversity and promote innovative alliances tapping new sources of finance from the private sector and from philanthropists, and thus provide additional resources. We must secure nature reserves and other protected areas and thus promote good governance and an effective and fair management of these protected areas which actively involves the participation of the local people and observes human rights. We must combat poaching and the illegal wildlife trade along the entire value chain throughout the world. We must implement sustainable utilisation concepts in agriculture and forestry as well as fishery and avoid biodiversity losses through the use of fertilisers and pesticides as well as land degradation while simultaneously changing consumer behaviour in general. We must combat climate change, which is regarded as one of the most important causes of species extinction, and commonly address biodiversity and climate change mitigation and adaptation. We must pursue a holistic, interdisciplinary health approach covering the complex links between human beings, livestock and wild animals and seeking systemic solutions to health problems. And last, but not least, we must ensure that the population in developing countries receive an appropriate share of the profits accruing from the exploitation of biodiversity in research and business.

**How optimistic are you that the resolutions agreed in Kunming will not remain mere paper tigers?**

Given the level of engagement that many of the contracting states have shown over the last few months, also because of the impact the corona pandemic has had, I feel confident that we are going to implement the resolutions in a joint effort. It is however important to strengthen the implementing and control mechanisms and commit all relevant actors to take action.

The interview was conducted by Silvia Richter.

The complete interview is available at: [www.rural21.com](http://www.rural21.com)

## Shaping the transformative change – development cooperation’s role

There is a growing body of evidence that, if the current pace of biological extinction does not abate, most of the Sustainable Development Goals will not be reached – thus threatening the Agenda 2030 as a whole. Taking the example of German development cooperation efforts to conserve and restore biodiversity and ecosystem services, our authors show what international collaboration can and must do to counter the biodiversity crisis.

By Anika Busch, Carolin Frisch and Justus Kröger\*



The promotion of non-timber forest products (NTFP) for the benefit of women and indigenous groups is a focal aspect of a GIZ project in Cameroon.

Photo: GIZ

About 80 per cent of the world’s biological and genetic resources are located in the tropical and subtropical zones, mostly in developing countries. However, in those countries, biodiversity and the ecosystem services related to it are under growing pressure (see also articles on pages 6–8 and 10–13). This is all the more dramatic since especially in the Global South, people rely on healthy ecosystems to satisfy some of their basic needs and for their economic development. For instance, groundwater ecosystems and their (micro)organisms provide one of the most important bases of life – drinking water. Flowing waters and active floodplains maintain flood retention, and forest ecosystems help control the water cycle by regulating precipitation, evaporation and flows, as well as having an enormous impact on the local, regional and global climate as carbon sinks. Trees in tropical rainforests store

half as much carbon as trees outside the tropics. In addition to bearing an important cultural and spiritual significance for local groups and indigenous peoples, natural resources are an important source of income for many people, especially in developing countries.

At the same time, developed countries benefit immensely from intact ecosystems in the Global South regarding global climate and water regulation, natural resources for countless industrially manufactured goods and basic elements for numerous pharmaceutical drugs. Thus, it is evident that a biodiversity-rich planet is the basis of life for us and the generations to come.

Recognising the fact that the overwhelming majority of the Sustainable Development Goals (SDGs) will not be reached if the cur-

rent pace of biological extinction is not slowed down, the German Ministry for Economic Cooperation and Development (BMZ) supports its partner countries world-wide in three biodiversity-related fields: conservation, sustainable use and restoration of ecosystems (see also examples given on opposite page).

Protected areas are one important instrument for the conservation of ecosystems and ecosystem services, since they act as a refuge for animal and plant species while also allowing biological processes to run unimpaired. Additionally, protected areas allow the maintaining of natural distances between humans and wildlife, thus reducing the risk of pathogen spill-over leading to zoonoses (infectious diseases caused by pathogens which have jumped from animals to humans). It is of high importance for protected areas to be specifically established in



## SUSTAINABLE RESOURCE USE IN ETHIOPIA

Ethiopia is part of two biodiversity hotspots of global importance, the Eastern Afromontane and the Horn of Africa. However, its biodiversity is under threat. The population is growing rapidly, overgrazing is increasing due to intensive pastoralism, and large-scale investments in industrial agriculture often don't consider biodiversity and its ecosystem services. In order to preserve the country's unique biodiversity, German development cooperation supports the relevant Ethiopian federal authorities and regional governments in successfully implementing strategies and measures for the conservation and sustainable use of protected areas and forests, thereby improving the living conditions of the local population. In the Sheka and Yakup biosphere reserves, around 30,000 people have been enabled to improve their income through the sustainable production of coffee and the integration into relevant value chains. As a result, the forests – where the coffee can originally be found – are used sustainably and are protected from deforestation.



Photo: GIZ/ Silas Koch

## INTEGRATED LAND USE PLANNING FOR PEATLAND ECOSYSTEMS OF INDONESIA

Peatland ecosystems of Indonesia (peat and mangrove forests) are complex and interconnected ecosystems known for their high biodiversity, extremely efficient terrestrial natural carbon storage and their important role in freshwater filtration and flood protection. About two-thirds of the world's CO<sub>2</sub> emissions from the destruction and conversion of peatland ecosystems come from Southeast Asia, primarily Indonesia. To address the devastating consequences of peatland destruction and the loss of its biodiversity, integrated land use planning and land use policies are needed at national, provincial and district levels. Therefore, German development cooperation supports the administration of North Kalimantan province in developing its planning and implementation capacities to rehabilitate peatland ecosystems in the Kayan Sembakung Delta. This should lead to improved management practices for peat ecosystems and wetlands as well as improved living conditions for the local population.

## EMPOWERING THE INDIGENOUS POPULATION IN HONDURAS

In the Mosquitia region of Honduras, the indigenous population have largely preserved their traditional way of life, thereby maintaining species-rich ecosystems that are part of the Central American Biocorridor. Despite the abundance of natural resources, poverty affects more than half of rural families living in subsistence farming due to lack of market access and increasing crop failures caused by climate change. Through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the BMZ supports the clarification of responsibilities for the administration of the territories that have resulted from land titling. Building on this, it strengthens the technical and organisational skills of the indigenous territorial councils, so that they can fulfil their tasks appropriately. Gender-sensitive promotion of democratic processes is intended to increase the participation of women in political decision-making processes and their implementation. In addition, producers are supported in the production and sale of food for school meals and other markets to increase food security through income generation and increased availability of food at local level. Alternative income options for women (e.g. honey) are particularly encouraged.

## SOIL BIODIVERSITY FOR SUSTAINABLE AGRICULTURAL INTENSIFICATION

The Food and Agriculture Organization of the United Nations (FAO) defines soil biodiversity as the variation in soil life, from genes to communities, and the ecological complexes of which they are part, that is from soil micro-habitats to landscapes. In other words, soil biodiversity represents the variety of life below ground. Soil organisms including bacteria, fungi, earthworms and termites are essential for most of the ecosystem services that soils provide, namely soil formation, decomposition and nutrient cycling, carbon and nitrogen fixation and sequestration, infiltration and storage of water.

A research cooperation between GIZ's Global Programme "Soil Protection and Rehabilitation for Food Security" and the International Center for Tropical Agriculture (CIAT) focused on agronomic management controls on microbial populations in soils and found that the application of farmyard manure (FYM) alongside reduced tillage is a good strategy to promote diversity and abundance of soil microorganisms. This recommendation subsequently supported GIZ in its efforts to out-scale sustainable ways of intensifying agriculture in Western Kenya, taking into account soil biology, microbial activity as well as associated nutrient use efficiency and crop productivity.



Photo: GIZ/ Jörg Böhling

areas where biodiversity hotspots occur – not just in territories without (economic) benefits for humans. For instance, some protected areas exist on maps or in legislation but offer little real protection to biodiversity (“paper parks”) due to ineffective management or insufficient financing. Inclusive and human rights-based (co-)management approaches can simultaneously provide social and ecological benefits. This implies a sustainable use of natural resources aimed at balancing social, economic and cultural needs with ecosystem sustainability and resilience.

Change of land use, mostly through agriculture, is a key driver of biodiversity loss, because of overexploitation, pollution and degradation of ecosystems, among others. Transforming our agricultural and food systems could hence result in a quantum leap towards biodiversity conservation – for example with agroecology (see also article on pages 14–15). This very promising approach aims at bringing our current food systems towards sustainability and resilience. It goes beyond agricultural production, including a variety of social, political and environmental aspects that help maintain healthy agro-ecosystems while providing safe and nutritious food for all. Agroecological practices are local-specific and use, preserve and improve biological and ecological processes in agricultural production, hence reducing levels of external inputs (such as synthetic agrochemicals), and create diverse, resilient and more productive agro-ecosystems. Agroecological farming systems place a strong focus on diversification, e.g. through practices such as mixed cropping and intercropping, agroforestry, use of the locally adapted seeds and biological pest control and management, among others.

Areas where ecosystem services are already degraded require a restoration of ecosystems, which brings them closer or even back to their natural state. This refers to forests, farmlands, wetlands and oceans. Assisting them in recovering can lead to healthier, biodiversity-rich ecosystems which can better provide e.g. fertile soils and thus improve the livelihoods of people depending on them.

### Moving the international dialogue forward

So far, efforts by countries and organisations have fallen short of ameliorating the looming biodiversity crisis. One reason for the current downward trend in biodiversity is a persistent lack of funds, with 85 billion US dollars spent

annually world-wide, only a fraction of what is necessary. The global need for investment in biodiversity is estimated to be up to five times higher. There is a huge necessity to mobilise more public and especially private funding in all member states.

Germany is very active in moving the international dialogue forward. With more than 80 other countries, it has joined the Leader’s Pledge for Nature, committing to decisive action on nature and biodiversity to protect planetary and human health. Germany also recently became a member of the High Ambition Coalition (HAC), an intergovernmental group championing the “30 by 30” target globally. While these special-purpose organisations serve an important function in shining a spotlight on vital issues, existing forms of international coordination and cooperation should embrace the efforts for biodiversity. For example, the G7 and G20 should align their agenda with the United Nations Framework Convention on Climate Change (UNFCCC) and Agenda 2030.

In order to address the main drivers of biodiversity loss and achieve the goals of the Convention on Biological Diversity (CBD), positive turnarounds and a transformative change of society and economy are needed. As global common goods, natural resources and biodiversity require that actors at all levels assume fair responsibility. All humans depend in a systemic way on the persistence of terrestrial and marine ecosystems, and the effects of their destruction and degradation do not stop at borders. This means that biodiversity conservation needs to be mainstreamed into all policies and all sectors, including agriculture, water management, the fishing industry, mining and infrastructure. The agriculture and livestock sector, for instance, is a key leverage point for transforming our food systems. Sustainable production systems, like agroecology or traditional indigenous farming, as well as changes in our eating habits, are a prerequisite for ensuring reliable and healthy diets for a world population that will grow to more than nine billion by 2050, as is meeting the challenges of anthropogenic climate change, loss of biodiversity and ecosystem services.

### What can development cooperation do?

Biodiversity in the context of transformative change can thus be seen from two perspectives. Biodiversity conservation can be the goal of a transformative change process. At the same time, biodiversity conservation and its sustain-

able use are means to achieve transformative change aimed at a range of other societal challenges. So far so good – but how can development cooperation support this transformation? It is essential to promote the co-creation of transformative visions and new narratives to overcome the supposed opposition between human development and biodiversity conservation. By emphasising diverse co-benefits and synergies (e.g. pandemic prevention), development cooperation can engage in dialogues and mainstreaming processes with different sectors and actors and thereby extend the action arena for transformative change. Furthermore, development cooperation can contribute to a “transformative governance” by conducting capacity building for political actors and supporting the enabling structures needed for the implementation of an economic and societal transformation. When adopted, development cooperation can also assist partner countries in transferring the – hopefully transformative – aspirations of the new post-2020 global biodiversity framework into national policies and implementation structures. In addition, development cooperation can create good practices which stimulate new politics and strategies and prepare upscaling.

Thus, we need much more than to close the financial gap for biodiversity conservation: we need strategic alliances, a focus on synergies and co-benefits for different actors and sectors as well as innovative and courageous ideas and capacities for implementation in order to achieve a just, sustainable and green transformative change.

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# The Agrobiodiversity Index

Despite its importance, little is known about the state of agrobiodiversity across the world. Evidence of commitments made and actions taken to use and conserve this biodiversity is also scarce. As a result, agrobiodiversity is often completely left out from dietary guidelines, agricultural and environmental policies, biodiversity assessments and global monitoring efforts.

By Roseline Remans\*

The importance of monitoring agrobiodiversity as a key food system characteristic is increasingly recognised by farmers and consumers as well as by decision-makers and programme managers, particularly in the context of increasing climate change. Against this backdrop, the Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT), together with multiple partners, developed the Agrobiodiversity Index. The Index is an innovative tool that, crossing disciplinary boundaries, brings together existing measures and data on breeding and seed systems, production systems, food markets and diets, analysing them under the lens of agricultural biodiversity for multiple goals.

By accessing open data on food and agriculture, the tool allows biodiversity trends in food systems to be understood and monitored. In particular, it helps seed and food systems actors to measure agrobiodiversity in selected areas or value chains and understand to what extent their commitments and actions are contributing to the sustainable use and conservation of agrobiodiversity. Where data are available, the Agrobiodiversity Index equips food system actors with the data-based insights needed to make informed decisions to achieve sustainability and resilience. Where data are missing, the Index helps to flag these critical data gaps for planning.

Decision-makers can benefit from the Agrobiodiversity Index in different ways. First, it can help them identify risks in food and agriculture related to low agrobiodiversity. Second, they can use the information generated through the Index to plan interventions and formulate evidence-based policies and strategies that efficiently address today's global challenges – including malnutrition, climate change and natural resource degradation. De-

Agricultural biodiversity, or **agrobiodiversity**, is a subset of biodiversity which includes the diversity of crops and their wild relatives, trees, animals, microbes and other species that contribute to agricultural production.



A women selling vegetables in a market in Western Bengal, India. Small photo: Maize diversity in Ecuador.

Photo: Krishnasis Ghosh/ Bioversity International

spite its importance, the majority of the interactions between biodiversity, ecosystem services and the agricultural sector are invisible in established informational systems – including the quantities and respective prices of food and agricultural trade. Third, Agrobiodiversity Index results allow countries and programmes' performance related to use and conservation of agrobiodiversity to be compared. This can foster knowledge exchange among programmes and countries, by identifying best practices to sustainably use and conserve agrobiodiversity.

The Agrobiodiversity Index has been used by, and tailored to, various organisations. Initially, most demand came from public sector partners. This led to a first series of country profiles which assessed existing levels of agrobiodiversity in markets and consumption for healthy diets, in production systems for sustainable agriculture, and in genetic resource management for future options. More recently, the private sector has become increasingly interested in leveraging agrobiodiversity for more sustainable solutions and considering related measures in their monitoring, assessments and

decision-making. As examples, the food rating company HowGood has used the Index to incorporate agrobiodiversity layers in its sustainability assessment tool, and Wholechain to integrate agrobiodiversity metrics into its blockchain-based technology for traceability of supply chains. Multi-partner initiatives such as the Food Accelerator FACT have also adapted and adopted the Index to integrate agrobiodiversity principles and measures in their tools and activities.

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More info: [www.agrobiodiversityindex.org](http://www.agrobiodiversityindex.org)

## Agrobiodiversity and integrated seed systems to improve smallholder livelihoods

Crop and tree diversity are essential to agriculture sustainability and food and nutrition security. The diversity of species and varieties that are available for farmers and the ways through which this diversity is made accessible to them depend on seed systems. But what must seed systems be like to enhance agrobiodiversity and smallholders' livelihoods? Our authors take a look at the strengths and weaknesses of existing seed systems and experiences gained from a ten-year project in five countries on three continents.

By Isabel López Noriega, Gloria Otieno and Michael Halewood

Seed systems (see Box) are at the origin of agriculture. Over millennia, for each crop present in the farm, the farmer had a strategy to select, multiply and use seeds for the next season. Remaining seeds were sold or exchanged for other seeds from neighbouring farms. Thus farmers themselves were breeders, seed multipliers, quality controllers and seed suppliers. As agricultural research and development has become more specialised and agricultural production has evolved towards industrialisation in many parts of the world, what used to be performed by farmers has been taken over by specialised actors – with a profound impact on the shaping of seed systems and on the diversity of crops and varieties that they supply to farmers.

### Seed systems and their impact on farming

At present, several types of seed systems exist:

#### Formal seed systems:

##### small farmers usually underserved

On the one extreme, formal seed systems deliver seed of crop varieties that have been bred, registered and released by specialised organisations based on predetermined criteria and procedures created through national policies and laws. The seeds in this system are a result of investments in research and breeding governed by the principles to maintain varietal identity and purity, and to deliver seed of optimal physical, physiological, and sanitary quality. Actors who operate in the formal system produce and supply seed whose quality has been certified by official governmental organisations (or their appointed agents) according to existing laws and regulations, which are often based on internationally agreed standards. In developing countries, public and private investments in agricultural R&D and seed sector development have generally targeted the main staple crops (rice, maize, wheat), with much less investment in minor cereals (e.g. millets, sorghum), tubers, legumes, fruits and vegeta-



Ugandan banana farmers.

Photo: A. Vezina/ Bioversity International

bles. Commercial vegetable seed production is taking off in a number of developing countries, such as Kenya, India and Thailand, but often relies on exotic varieties of 'cosmopolitan' vegetables rather than native crops or locally bred varieties. In addition, commercial seed companies are reluctant to extend their business to geographical areas with poor market infrastructure, due to the difficulties involved in reaching these areas, and the lack of reliable information about the actual and potential demand for certified seed and other complementary inputs such as fertiliser, pesticides and irrigation systems. In consequence, remote areas, which is where many poor smallholder farmers live, remain underserved by 'formal sector' components of seed systems.

#### Informal systems: threatened diversity

On the other extreme, informal systems continue to be managed mostly by farmers and their communities. In these systems, farmers select and multiply seed of both landraces and improved varieties that are adapted to the local conditions. Seed distribution takes place based largely on the application of local indigenous

knowledge passed down over millennia, and is regulated by informally established norms. Informal systems prevail in many developing countries around the world, supplying at least 65–80 per cent of seeds in many of them. While high levels of crop and tree diversity have characterised local seed systems in many regions, this diversity is threatened or in the verge of disappearing in many territories because of climate change, decreasing quality of the seed and local communities' isolation as more and more farmers migrate to urban areas. Diversity is also affected by land use changes and conversion to high-input agriculture, which often leads to homogenisation of crops and varieties.

#### Integrated systems: combining two worlds

The functioning of informal seed systems and the role they play in ensuring seed availability and accessibility have attracted considerable attention in the last decade. A number of scholars have stressed the need to look for complementarities between formal and informal seed systems, the potential of informal seed systems to provide seed wherever the for-



mal sector is absent, or in addition to it, and the possibility to mobilise informal channels to distribute improved crop varieties from the formal system alongside farmers' varieties. Mixed or integrated systems have emerged in a number of countries. They combine formal and informal elements. For example, farmers and farmers' organisations working outside the formal channels cultivate, multiply and distribute both improved varieties developed by the formal sector and their own landraces; governmental and non-governmental organisations (NGOs) provide support for the certification and distribution of farmer-bred varieties and farmer-produced seed, in line with national rules and regulations.

So far, integrated seed systems facilitated by governmental organisations and NGOs have overly focused on the commercial and operational aspects of seed production, often overlooking the importance of the genetic quality of planting material. This is because, generally, these systems have relied on the same varieties used in the formal systems. So although they contribute to enhancing distribution of seeds, particularly in areas not served by the commercial seed sector, they do not add much to the diversity of crops and varieties that become available to farmers. Taking four Nepalese sites as illustrative examples, the Table presents the gradient from purely informal to purely formal seed systems, highlighting how some basic characteristics change along this gradient.

Against this background, in the last decade, the Alliance of Bioversity International and the International Centre for Tropical Agriculture (CIAT), in partnership with the Swiss Agen-

**Seed systems** comprise the actors and the institutions that govern the development, multiplication, processing, quality control, storage, distribution and marketing of seeds. (Maredia and Howard, 1999).

cy for Development and Cooperation (SDC) and research and development organisations in Bolivia, Burkina Faso, Nepal, Uganda and Uzbekistan, has led a project aimed at increasing crop diversity in seed systems, with a particular focus on informal and mixed or integrated systems. The following paragraphs summarise the project's main activities and achievements, and include reflections about the challenges that still persist.

### Understanding crop diversity and farmers' preferences

The project's first step was to understand and characterise the varietal diversity of the target crops in the project sites. For this purpose, scientists, seed enterprises, governmental agencies and seed sellers were involved in a wide-scale participatory characterisation of varietal diversity together with farmers' communities. The farmers led the process of identifying the characteristics they wanted to focus on, based on their own contexts and preferences, and ranking varieties accordingly. They identified a number of characteristics that breeders often do not focus on, including adaptability/robustness, cooking requirements, taste and fodder values. In addition to increasing various actors' understanding of the actual and potential value of the varieties, this work allowed the

teams to identify and prioritise traditional and farmers' varieties for registration in the national catalogues of commercial varieties, and their subsequent commercialisation in the form of quality certified seed, as we explain below.

### Building capacities and opportunities at community level

The project reinforced the technical capacities of farmers in the project, who produce and cultivate seed for themselves, local markets and seed industry, either individually or as part of farmers' associations and cooperatives. Thanks to combinations of training, new facilities, technical equipment and good quality foundation seed, farmers increased their capacities to produce quality seed of a broader range of varieties. The project also supported marketing and promotional activities. Ultimately, seed producer groups and individual farmers were able to sell more seed and at higher price in all five countries. A number of farmers in Uzbekistan, Nepal, Uganda and Bolivia have become custodian farmers. They maintain high levels of crop diversity on their farms, produce high quality seed for sale or distribution within their communities and train other farmers on good agricultural practices and seed production.

Specialisation in native varieties, landraces and traditional varieties improved through participatory plant breeding has given a comparative advantage to the seed producer groups and individuals involved in the project. In Nepal, Uganda and Uzbekistan, community-based seed producer associations have managed to establish long-term seed supply arrangements

### Selected characteristics along the continuum of seed systems in Nepal

Seed system designation Illustrative locations in Nepal (village, district)	Informal – own seed Ghanpokhara, Lamjung	Informal – local seed Begnas, Kaski	Mixed Kachorwa, Bara	Formal Some crops and areas (mainly in Terai region)
Seed source	Own retention, limited exchange with neighbours or relatives	Own retention, neighbour farmers, relatives, seed cooperatives, including from neighbouring villages	Own retention, neighbours' relatives, seed co-operatives, seed dealers, seed industry	National agricultural research council and seed industry, directly or through seed dealers
Application of existing legal framework	0 Little to no contact with legal framework	+	++ Partial application	++++ Strict application
Integration of seed and crop markets	+	++	+++	++++
Access to new seeds and new varieties	+	++	+++	+++
Varietal richness (number of different varieties)	++	++++ Mostly landraces	+++ For rice, half are landraces, half are modern varieties	+
Expected allelic diversity (genetic diversity within varieties)	++++	++++	+++	+

Source: Adapted from Wyss et al. 2018. Scale: ++++ = high/numerous, +++ = medium, ++ = little/few, + = low/very few, 0 = none (explanations added where relevant)

with farmers' cooperatives and medium-size seed enterprises. Along all the steps, the involvement of seed quality control agencies and officers, as well as extension agents, has been crucial to helping farmers become familiar with regulatory aspects and with the individuals who enforce the rules. At the same time, officers and extension agents have become more aware of smallholder farmers' realities, needs and potential, particularly as holders and providers of seed diversity.

In Burkina Faso, Nepal and Uganda community seedbanks existed when the projects started to operate. Community seedbanks are local organisations whose core functions are to maintain, safeguard and exchange local and farmer-preferred seeds for local use. The project's efforts focused on improving the seedbanks' capacities to operate both as repositories of local genetic diversity and reliable seed providers for their communities. These objectives were largely met. In Uganda, the success of the existing community seedbanks encouraged the project team to support the opening of three more in different sites of the country. However, economic sustainability continues to be a challenge for community seedbanks. To address this challenge, in Nepal and Uganda, the cooperatives in charge of the seedbanks received assistance to open commercial branches. While these branches are demonstrating to be effective financial mechanisms, questions are being raised with regard to the possible negative effects they may have on the seedbanks' interests and capacities to continue conserving crop genetic diversity, and supplying such diversity to farmers under favourable conditions.

### Initial steps towards an enabling policy environment

Discussions are slowly progressing in the five countries to develop policies and programmes from municipal to national levels to support informal and integrated seed systems. We see advances in this direction in the adoption of the Food and Agriculture Organization's Quality Declared Seed System in Uganda for areas where the presence of a formal seed sector is limited and for crops and varieties that are not usually produced by seed enterprises. Another example is the official commitment by district offices in Nepal to provide technical and financial support to community-based seedbanks and cooperatives as part of those districts' programmes for the conservation and sustainable use of agrobiodiversity. In Uzbekistan, the project has contributed to raising the profile of crop diversity in the existing policy



Scientists visit rice seed fields managed by farmers next to Pokhara, Nepal.

Photo: Isabel López Noriega/ Bioversity International

and legal frameworks. This has resulted in the adoption of Resolution #504 on "Measures on restoration of local varieties of agricultural crops with unique traits and features that are in danger of extinction and development of their foundation seed supply system", of the 24<sup>th</sup> August 2020, by the Cabinet of Ministries of Uzbekistan. Through this Resolution, the government commits to provide support to study, conserve, multiply and mobilise local agrobiodiversity, including farmers' varieties. With the Resolution, the government of Uzbekistan recognises and values the national heritage of interspecific and intraspecific crop diversity and the evolving role of farmers in coping with environmental and economic challenges.

### Registration of farmers' varieties as a step towards wider commercialisation

The project has also contributed to advances in the registration of landraces and farmers' varieties in national catalogues of commercial plant varieties in Bolivia, Nepal and Uzbekistan. The process of applying for registration of these types of varieties has challenged countries' established standards and procedures, and has led to the adoption of flexibilities which, in some cases, have been normalised and integrated in the regular procedures. Thanks to these advances, landraces and farmers' varieties have changed their status from "informal" to "formal", resulting in small farmers being able to produce and distribute seed of these varieties with certified quality, for which they can request a higher price than that of informal seed. The opportunity to sell certified quality seed has also allowed them to reach markets beyond the local ones. The inclusion of landraces and farmers' varieties in national catalogues contributes to the diversification of crops in the seed market and the recognition of farmers as generators of crop diversity.

However, there are still some loose ends. In all three countries, most of the varieties registered so far bear the name of the seed authority that processed the registration, a public research institute or the national agricultural research organisation, and not those of the farmers who have conserved and developed those varieties. These governmental or research organisations, and not the farmers, are thus in charge of maintaining the varieties. This raises fundamental questions in relation to farmers' rights and responsibilities over the genetic resources that farmers generate and maintain. It is also important to note that despite the technical and procedural flexibilities that have been introduced in the mentioned countries, the length of the process for applying and the technical requirements still keep farmers from following the procedures by themselves. In these countries, it is too early to assess whether or not the transaction costs involved in variety registration are worth assuming. This will depend on farmers and other actors' capacities to effectively multiply and sell the seed of the registered varieties, which in turn will be very much influenced by farmers' demand for landraces and farmers' improved germplasm.

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## Conserving biodiversity, meeting people's needs

Ideally, restoring and conserving biodiversity in a region ought to be based on cooperation with local inhabitants and benefit them as well. Our authors have a look at projects in Latin America with a focus on supporting governance structures.

**By Jane Carter, Francisco Medina, Kaspar Schmidt and Martha Tax**

Throughout the world, economic development and human prosperity has often taken place at the expense of biodiversity. Where areas of the planet's once rich flora and fauna remain, it makes sense to work with the people living closest to this biodiversity, supporting conservation efforts through their participation – and in so doing, generating livelihood opportunities. This, of course, is the basic theory of change of many projects aiming to interlink conservation and local livelihood objectives. It is also implicit in the post-2020 global biodiversity framework (GBF) Action Targets (albeit not yet ratified). Arguably, there are two main approaches. One is productive use, generating additional value from the resource or areas immediately around it through sustainable harvesting, resource management and cash crop development (often for ecologically sensitised niche export markets). The other main approach is to avoid harvesting and generate additional value from the resource through payments to restore or conserve it.

Where possible, Helvetas aims to integrate these two approaches through supporting land use planning at a landscape level – recognising that productive systems are also closely interlinked with the natural services of ecosystems and their biodiversity (see also article by Zora Urech, Kaspar Schmidt and Francisco Medina in *Rural 21*, no 4/19). In areas delineated for productive use, interventions may support agrobiodiversity for food security or value chains such as cocoa, coffee or plants that provide natural ingredients for food and cosmetics. In areas delineated for conservation, there is often a particularly strong element of supporting governance structures at community level and beyond, linked with awareness raising about the intrinsic value of the resource. In this article, we examine selected projects in Latin America that focus on – or contain strong elements of – the latter approach (see Box on page 36).

### The biodiversity hotspots of Mesoamerica and the Andes

The concept of “biodiversity hotspots” is often used for prioritising biodiversity conservation



The village of Kiuñalla, Peru, with the forests that surround and protect the village, its agricultural fields and meadows.

Photo: Nicolas Villaume

interventions. Terrestrial spaces having such a label must meet two criteria: high endemism of vascular plants and at least 30 per cent of the natural vegetation intact.

Helvetas works in two important biodiversity hotspots: Mesoamerica and the Tropical Andes. The former comprises the subtropical and tropical ecosystems from central Mexico to the Panama Canal, including all of Guatemala, Belize, El Salvador, Honduras, Nicaragua and Costa Rica, as well as a third of Mexico and nearly two-thirds of Panama. The latter extends from western Venezuela to northern Chile and Argentina, and includes large portions of Colombia, Ecuador, Peru and Bolivia. Both have important global relevance as centres of origin (e.g. maize, potato, tomato, beans and other crops and animals originating in Central and South America), and as the habitat of numerous endemic species, with unique ecosystems. They are both home to more than 60 indigenous groups; over 70 per cent of species of animals and plants in the world are

found within their boundaries. Both also suffer similar stresses and threats to livelihoods and biodiversity, such as conflicts over land ownership, land use changes, deforestation, illegal activities and weak institutions for natural resource management.

### Incentives and subsidies for biodiversity conservation

The main incentive for biodiversity conservation used by our selected projects is revenue generation from ecotourism, whilst the main form of subsidy is payment for environmental services (PES).

Ecotourism has, in theory, high potential for revenue generation. This has been demonstrated in the seven municipalities around the caldera of the volcano Uku'uch Ixcánul in Guatemala, where Helvetas has been working on promoting various community tourism initiatives since 2016. These include rural

### Selected projects contributing to biodiversity conservation in Latin America

Type of activity	Innovation
Andean Forests Programme (2014 – 2021)	A regional initiative funded by Swiss Development Cooperation (SDC) supporting knowledge exchange on valuing and conserving the biodiversity of Andean forests across Peru, Colombia, Ecuador and Bolivia, <a href="http://www.bosquesandinos.org">www.bosquesandinos.org</a>
Climate Change Adaptation Programme (2009 – 2016)	An SDC project aimed at enabling vulnerable people in Cusco and Apurimac, Peru, to increase their capacity to adapt to climate change, reducing impacts of the consequences of climate change on their livelihoods by including solutions based on nature and traditional knowledge.
Uku'uch Ixcanul Conservación y Desarrollo en el Altiplano Occidental de Guatemala, CDAO (2016 – 2022)	Originally two separate projects of the "Fondo para la Conservación de Bosques Tropicales" FCA and Helvetas, these are now managed under one umbrella. They work to strengthen forest governance, building on indigenous systems to conserve biodiversity and provide opportunities for sustainable tourism whilst mitigating threats to biodiversity and water resources in the departments of Totonicapán, San Marcos and Quetzaltenango.
Water for Abancay and Communities, Euroclima+ water (2020 – 2023)	A European Union-funded project aiming to ensure a responsible and equitable water supply to residents of Abancay and the Mariño micro-watershed, Peru, through a sustainable investment mechanism based on multi-actor governance that also conserves the natural resources and biodiversity of the catchment.
Pachayachay Pachayatiña, Euroclima+ risks (2019 – 2021)	A European Union-funded project aiming to reduce agricultural losses caused by droughts. It works with local and other authorities to improve preparedness and reduce risks associated with drought in specific municipalities of La Paz (Bolivia) and Puno (Peru). In its interventions in wetlands, it contributes to biodiversity conservation.
Andes Resilientes (2020 – 2024)	A regional SDC-funded initiative in Bolivia, Ecuador and Peru implemented by a consortium of Helvetas and the Foundation Avina. It has an overall pro-poor focus and aims to strengthen national and sub-national climate change dialogue and up-scale good practices in climate change adaptation which also address biodiversity conservation.

homestays, the production and sale of handicrafts and food items, guided forest tours, zip lines, hot springs, and swimming areas. Project data shows that 27,871 local people, 53 per cent of them women, have actively participated in these activities – generating an additional income for 4,661 families. The forest covered in this initiative, totalling more than 14,800 hectares, is under the ownership of the municipalities. This means that forest conservation and the benefits associated with it through at-

tracting tourists can be directly linked. Each municipality has a different co-management structure, but in all cases community committees contribute to the planning and implementation of conservation objectives such as the efficient use of firewood (woodlot plantations, wood-saving stoves), forest fire prevention, restoration using native species, biological monitoring, and compensation mechanisms for downstream water supplies (PES). In some cases, the municipalities charge tourists an en-

trance fee (usually two or three US dollars) in addition to charging separately for the services offered; sometimes the communities charge the fees directly themselves.

Many of the tourists who have visited the Uku'uch Ixcanul came from other countries – the USA and Europe as well as Latin America. Inevitably, the COVID-19 pandemic has halted this flow of visitors and has shown the danger of relying on external actors. In future, greater focus will be placed on attracting local tourists, especially over festival periods. These are easier to manage in terms of predictable timing; local tourism could also be a new form of validating traditional heritage and strengthening community identity.

The earliest PES mechanisms supported through our selected projects generally focused on payment for a safe and reliable water supply. Under such schemes, downstream communities contribute financially to forest, wetland or grassland restoration and/ or conservation activities conducted by communities living in the upper reaches of the catchment. For example, under the Andean Forests Programme and the Euroclima+ water project in the Department of Apurímac, Peru (see Box), the rural communities (Ccerabamba, Huirónay, Pachani, Kiuñalla, Atumpata, Llanucancho and Micaela Bastidas) have come together with the regional and municipal governments and the private water and sewerage service providers to form the MERESEH (this is the Spanish acronym for water ecosystem service compensation mechanisms) for the city of Abancay. This process began in 2015 and was finally approved and implemented in 2020. A Reserve



An elderly local farmer in the Andean forests.

Photo: Nicolas Villaume





Local people restoring Andean forests with native species as part of the activities of the Quiroz-Chira Water Fund in Northern Peru.

Photo: Naturaleza y Cultura Internacional

Fund was created, operated by a coordination committee led by the public water and sewage provider company, with the participation of the communities involved. An eco-hydrological system, implemented since 2017, is one of the main monitoring tools of MERESEH. Under this, hydrological variables (runoff, volume and evaporation), climatic variables (precipitation and temperature) and bio-physical variables (soil moisture, groundwater level in bogs and species composition) are all monitored as part of the annual workplan.

Various other pilot PES schemes are being provided with technical advice through the Andean Forests Programme. One example is in the rural commune of Kiuñalla in Apurímac, where 300 families receive payment for conserving 500 ha of indigenous forest and grasslands. Under the original agreement in 2019, this mechanism was devised to ensure downstream water supplies; however, it has now been expanded to include carbon credits through the platform Regenera. This platform channels voluntary contributions from companies seeking to offset their carbon footprint. Kiuñalla is also a national pilot of forest restoration under the national forestry authority.

Another example of a pilot PES mechanism comes from Colombia. In 2016, the Andean Forests Programme supported the Metro-

politan Area of the Aburrá Valley and Masbosques in the implementation of a BancO2 agreement (a funding mechanism, see <https://banco2.com>) in the framework of a Pact for Forests. This platform brings together civil society institutions and public and private sector entities interested in forest conservation and restoration to collaborate under time-bound agreements. Specifically, 300 farming families are receiving payment to conserve the important ecosystems on their land. Funds also come from carbon credits and are conditional on the communities adhering to a forest management plan with provisions for improving the quality and quantity of water, soil protection and the protection of flora and fauna. The plan also makes provisions for the education of children and medical treatment of the elderly.

### Some lessons learned

Many countries in Latin America have now developed PES policies and regulations, recognising their potential for revenue generation. Nevertheless, developing PES solutions on the ground is time consuming, generally requiring multiple partnerships between very different types of organisations (such as multiple levels of government administrations, private companies, NGOs and scientific institutions). A strong institutional mechanism with good gov-

ernance is needed, whether organised through the public or private sector. Our experience shows that if adequate resources are invested in establishing such a sound mechanism, it can be a very sustainable solution.

We have observed that the protection of natural resources is often assumed to equate the conservation of biodiversity; sometimes this is backed by data, and sometimes not. For the future, we feel it is important that the biodiversity is systematically verified – for example, through recording sightings of indicator species or periodic monitoring of species composition in sample plots. Although such monitoring has associated costs, these can be integrated into activities; one means of doing so is to engage university students who use the findings as part of their studies (as long as this is done in a collaborative, “win-win” manner).

Many hopes have been pinned on ecotourism, but the benefits – especially from foreign tourists – are erratic and often stay higher in the chain (with tour companies, etc). Although the Uku’uch Ixcanul example is broadly positive in terms of benefits channelled directly to the communities, the limits of foreign-derived earnings from such initiatives have been highlighted by the COVID-19 pandemic.

One paradoxical result of the pandemic is increased public familiarity with virtual communication tools, combined with greater awareness around the importance of biodiversity, including for human health. Visits to the Andean Forests Programme website have increased by 60,000 over the period 2019 to 2021, with 33,836 new users being registered in the period January – June 2020 alone. The challenge is to harvest this interest into funding for further practical biodiversity activities on the ground.

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What happens if we suffer another economic shock?

## New models to fund conservation are needed

With climate change impacts already upon us, the conservation of our protected areas is no longer a nice to have, it is a priority. One important supporter of global conservation efforts is ecotourism. However, the COVID-19 pandemic has exposed the vulnerability of this conservation approach. Therefore, we must urgently find new and innovative ways to value our natural capital, our author maintains. A look at the conservation crisis in Africa and a plea for global commitment.

**By Annie Sugrue**

Africa has 1,967 key biodiversity sites with 7,800 terrestrial protected areas that support the most abundant and diverse large mammal species in the world. Africa is also the custodian of the world's second largest rainforest, the Central African Congo Basin, which harbours a major proportion of global terrestrial natural assets, including significant biodiversity and critical ecosystem services that provide, amongst others, high levels of carbon sequestration and storage. Our natural capital is our greatest wealth, and it is largely upheld by ecotourism. But this is a fragile economic model that can be easily disrupted, as the past two years have shown.

### Wildlife-based tourism and conservation efforts heavily affected

The COVID-19 pandemic has had a serious impact on conservation efforts in Africa, for the economic downturn has been catastrophic across the world. Some of the fallout was tragic. For instance, twelve rangers who protect mountain gorillas in the Virunga national park, Democratic Republic of the Congo (DRC), were murdered. Millions of jobs all over Africa have been lost as a result of lodges and nature reserves closing, along with national borders, and recovery will take time. While the travel restrictions have seriously curtailed illegal trade, the lay-off of rangers is exposing conservation areas to an increased risk of poaching and as soon as borders reopen, illegal trade is likely to flourish again.

Wildlife-based tourism in Africa employed 3.6 million people and generated an estimated 29 billion US dollars (USD) per annum before March 2019, with these funds largely used for conservation. By April 2020, 99 per cent of the tourists had cancelled, and most have not yet returned, taking with them both park fees and the billions of dollars they spend on hos-

pitality, services, retail, etc. The reserves were left high and dry, unable to pay their staff, who carry out essential conservation services. Most protected areas are state-owned and managed, but there are an increasing number of private lodges and ranches as well as NGOs and private sector entities forming collaborative management partnerships with the state and others. Via Community-Based Natural Resource Management (CBNRM) – an approach that integrates conservation of our natural assets while supporting rural livelihoods of the communities that live inside or adjacent to protected areas – community-owned and run conservancies are supported. The approach focuses on diversifying local value chains while many continue to rely on income from wildlife and ecotourism. Zimbabwe's Communal Area Management Programme for Indigenous Resources (CAMPFIRE) was a champion for this approach in the 1980's across the Southern African Development Community (SADC), and it spread to Mozambique, Botswana and Namibia in the 1990s. There are more recent examples in Malawi and South Africa, the latter being supported by the African Safari Foundation (ASF), which works across sub-Saharan Africa to empower communities to take control of their own natural resources. These are critical interventions, since many of these reserves form a part of iconic wildlife reserves, including the Kruger National Park in South Africa.

Funding for conservation also comes from a range of global and regional sources, but even when there is no pandemic, the sector is chronically underfunded, and African states are unable to provide the resources to adequately fund conservation as they struggle to uplift their people from poverty. South Africa, for instance, needed to reallocate resources within the national government department responsible for the environment and nature reserves to plug the nearly 700,000 USD gap caused by a



lack of visitor fees to support the state-owned SanParks responsible for the reserves. It has become patently obvious that new models to fund conservation are needed.

### **Africa's natural capital assets: extensive, but under threat**

The Central African Congo Basin stretches mainly across six Central African countries, covers over 310 million hectares of primary rainforest and is the second largest rainforest in the world. The countries include Cameroon, the Central African Republic (CAR), the Republic of the Congo, the DRC, Equatorial Guinea and Gabon. Apart from its forest cover, this rainforest is the world's largest tropical peatland, estimated to store more than 33 billion tonnes of carbon; some put the figure at 80 billion tonnes. Additionally, its trees sequester up to 1.2 billion tonnes of CO<sub>2</sub> each year. The rainforest's cumulative carbon store is equivalent to at least three years of global fossil fuels emissions, and its atmospheric release would seriously undermine attempts to minimise climate change. The DRC has the largest forest cover area, with 107 million hectares, which is 60 per cent of Central Africa's lowland forest cover on 44 per cent of the land, but Gabon has 87 per cent of its land under forest, the highest percentage of the six countries. The Congo Basin is also a uniquely biodiverse area and has the world's largest population of forest mammals, with a total of 400 species, over 10,000 species of tropical plants and more than 1,000 bird species, 38

per cent of which are endemic. The forests produce over 75–95 per cent of the region's rainfall through evaporation and evapotranspiration. In addition, over 75 million people live in the area in 150 distinct ethnic groups, some of them in abject poverty.

Satellite imagery carried out by the University of Maryland, USA in 2018 showed that 165,000 km<sup>2</sup> of forest were lost from the Congo Basin between 2000 and 2014, mostly because of small-scale agriculture. The study concluded that at the current rate of deforestation the Congo Basin's forests would not survive past the end of the century. Conserving even one per cent of the basin's forested land would mean preventing the release of 230 million tons of CO<sub>2</sub> into the atmosphere. However, inhabitants of the forest are poor and rely on its natural resources to survive and this will be exacerbated by the economic impacts of the COVID-19 pandemic. With a lack of alternatives, poverty in the region is putting pressure on its natural resources, driving approvals for large-scale industrial agriculture, illegal logging, mining and other prospecting as well as livelihood support. Notwithstanding the need to deal with the growing humanitarian and health crisis, we cannot ignore the conservation crisis which is also in the making. If we carry on regardless, more economic shocks will come.

### **How new models for sustainable conservation could look like**

Building resilience must encompass the social development needs of developing nations which house an estimated 689 million people living in extreme poverty, i.e. on 1.9 USD per day. Two out of three of these people live in rural settings and are dependent on the natural environment to provide a livelihood. In the Congo Basin, 72 per cent of DRCs population live in extreme poverty, and under these conditions, it is easy to understand why poaching holds an allure and slash and burn small-scale agriculture is a main source of income. New approaches are needed to enable these people to earn a living while conserving natural capital. What could they look like?

### **Government and private-sector led initiatives**

One relatively new concept is the Natural Capital Approach (NCA). It broadly defines natural capital as the physical assets within an ecosystem that deliver economic value through ecosystem services. It can be cashed in, as when a tree is chopped down, or it can be retained to continue providing ecosystem services of value for longer. NCA has been adopted by the business and investment sector as a solution to fight climate change. The World Forum on Natural Capital took place in Edin-



Owing to the COVID-19 pandemic, income from wildlife-based tourism in Africa has almost entirely collapsed.

Photo: Silvia Richter

burgh, Scotland, in 2017. A growing number of organisations (among them the International Union for Conservation of Nature – IUCN, the UN Environment Programme and the World Business Council) are supporting this approach and form part of the Capitals Coalition whose ambition is that by 2030 the majority of businesses, financial institutions and governments will include natural, social and human capital in their decision-making. The World Economic Forum predicts that nature positive plans as put forward by the Natural Capital movement could unleash ten trillion USD and create 395 million jobs by 2030. This effort could be bolstered if Article 6 of the Paris Agreement were activated at the next UNFCCC COP26 in China this year and opened up international carbon markets. However, critics of this approach believe it to be more of the same, framing nature as capital and services where putting a price on it assumes that its entire value is captured. They say that if this value is embedded in a market-based economy, it links it only to monetary investments, unlike an ethical approach, which centres on social justice and equity with nature (also see article on pages 10–13).

More ambitious programmes include the Race to Zero Global Campaign that mobilises 708 cities, 23 regions, 2,162 businesses, 127 of the biggest investors and 571 higher education institutions committed to achieving net zero carbon emissions by 2050. With 120 countries, this is the largest ever alliance, covering almost 25 per cent of the global CO<sub>2</sub> emissions and over 50 per cent of global GDP.

### Community-based approaches

People lie at the centre of solutions to protect our biodiversity and preserve peatlands and forests. Community-Based Natural Resource Management (CBNRM) is a people-centred approach to conserving our natural capital assets such as water, soil, forests, peatlands and diversity. When we invest in supporting local people who live in and around areas that are rich in natural assets, they will become the custodians of these resources. CBNRM gives rights over land and natural resources to local communities and builds skills and capacity so that these resources can be sustainably utilised for generating income. However, if the main income model is ecotourism, without diversifying into other economic areas, these communities will suffer economic hardship when economic downturns strike, as in the case of the COVID-19 impacts. CBNRM areas need to be linked to local and regional markets so

that sources of income from sustainable fishing and the sustainable beneficiation of forests resources are enhanced and supply chains are not broken, even in times of economic stress. Ecotourism can provide a cherry on the top, but it should not be the main source of income. Resilience is critically important to conservation areas so that they remain intact for the prosperity of our planet and its people.



Photo: Silvia Richter

Forests provide a wide variety of resources that can be used in value addition, such as wood and charcoal fuel, furniture making, building materials, products, clothing, wood pulp for paper, flooring, cellulose fibres, packaging and so on. However, forestry materials need to be sustainably harvested or their use could contribute to the reduction in forest cover. Gabon and Republic of the Congo have chosen to invest in sustainable forestry value chains where beneficiation adds value to forestry and natural resource products creating jobs for local people rather than exporting raw logs. Lee White, a former conservationist and Gabon Minister for Forests, Water, Environment and Climate Change, has been reported as saying that “unless we make timber into a precious resource we won’t be able to maintain the trees”. He aims to create 200,000 forest-related jobs over the next ten years and increase forestry’s contribution to national income by 40 per cent, up from 4 per cent. White says that if you sell raw timber you get 200 USD per cubic metre, but if you turn the same timber into a resource you can get up to 2,000 USD, and with very precious woods, the payment increases. Gabon signed a ten-year deal in 2019 for 150 million USD with Norway so that it could earn income from keeping its forests intact as part of the Central African Forest Initiative (CAFI).

### Support for community ownership

Community forestry management practices are taking root in Africa. The SADC Protocol on Forestry promotes “the rights of com-

munities and facilitating their participation in forest policy development, planning and management”. A SADC-wide training programme has resulted in the rolling out of participatory forest management in many of its member states. Zambia, for instance, has devolved the control of 27,846 hectares of land to 16 communities, 13 of which have legal control. This process is also happening in the DRC, where two million hectares of the country’s community rainforest concessions have already been, or are about to be, handed over to communities with the potential for up to 75 million hectares to be made available for the scheme. Early evidence from the DRC confirms research from Latin America by the World Resources Institute which showed that communities “maintain or improve their forest carbon storage” when they have ownership. It requires training and capacity building so that communities can meet the sustainable management requirements of their concessions, which they own in perpetuity. However, these efforts require financing, and as the communities do not have the ability to navigate the process alone, nor to pay for training, these schemes need support.

### Long-term commitments are needed

There have been calls to recognise our global interconnectedness and understand how losing natural resources, particularly in areas rich with carbon stocks, is detrimental for every citizen in the world. The UN Environment Programme (UNEP) has made an urgent call to the international community to establish emergency funds to offset the losses of revenue from ecotourism during the pandemic. But what happens if the pandemic continues despite vaccines, or if we suffer another economic shock? We must be bold and recognise that in some areas of the world, natural capital assets must remain protected, or our world will forever be transformed. These resources are a global good, and it is starkly inequitable that some of the poorest nations in the world are insufficiently supported to conserve these resources. A global commitment is needed that guarantees long-term support which cannot be retracted. A global climate tax would go a long way to spreading the responsibility for conservation of natural assets to those who are better able to afford the cost of conserving these precious resources and preventing catastrophic climate change.



## Financing agriculture in West Africa – challenges and paradigm shift

The causal relationship between increased agricultural investment, agricultural development and economic development is a compelling finding from the agricultural revolutions in Europe, America and various parts of Asia. Reviewing the evolution of the agricultural financing paradigm, this article diagnoses the difficulties undermining agricultural financing in West Africa.

**By Ollo Dah and Toussaint Boubié Bassolet**

Financing is a critical issue in agricultural development. Insufficient infrastructure that weighs on transaction costs, problems of covariance due to climatic risks, price and market risk, but also bankers lacking experience needed to assess the value of the products they are asked to finance, the low level of education of farmers and farm workers, as well as the problem of guarantees are among the barriers standing in the way of banking institutions.

### Difficult, costly, risky

The supply of rural finance that integrates agricultural finance is often perceived as more difficult than the supply of urban finance for several reasons. Miller (2004) classifies constraints in rural finance as vulnerability constraints, including systemic market and credit risks;

operational constraints due to low returns on investment, low asset levels and geographic dispersion; capacity constraints, including infrastructural capacity, technical capacity, social exclusion, and institutional capacity; and policy and regulatory constraints, such as political and social interference and the regulatory framework.

In rural areas, clients are more dispersed than in urban areas due to the lower population density. The financial services demanded are small amounts, so transaction costs per unit are high for financial institutions. With generally less developed transport and communication infrastructure, information costs for providers and users are higher.

Agricultural loans are also perceived to be riskier because of production and marketing risks.

In addition, in rural areas, non-agricultural activities are invariably linked to agricultural activities, with rural households being subject to many of the risks that affect the agricultural sector, creating a covariance in outcomes. Concentration on similar agriculture-related activities in small geographic areas leads to a high covariance of farm household incomes. This situation is aggravated by the lack of formal insurance mechanisms to mitigate these risks. Informal insurance such as solidarity is inadequate to manage the systemic risks arising from income covariance. As a result, local financial institutions are vulnerable.

In addition, the weakness of human resources combined with the lack of appropriate guarantees complicates the development of a local service offer and weakens financial transactions. Moreover, in rural areas, loans are sometimes



Two women in the Tillabéri region of Niger whose husbands abandoned them to seek a better life in neighbouring coastal countries working in their market crops field to boost their income.

Photo: Arne Hoel/ World Bank

confused with grants because of poor management on the part of the public development banks and their frequently failing to adequately inform farmers about what are grants and what are loans, leaving them confused. These practices are widespread during election periods or in the populist positions of certain governments. All of these factors provide reasons why many commercial banks prefer the less arduous task of lending to the industrial and service sectors, and to urban consumers, rather than to the agricultural sector with its multiple difficulties and uncertainties.

Hollinger (2012) states that one of the risks financial institutions face when deciding to finance agriculture is the phenomenon of asymmetric information that may exist between lender and borrower. The information held by the lender regarding the specific elements that determine the feasibility of a potential investment or the financial context of a farm operation does not match that of the borrower. Neither does the lender know whether the borrower will use the funds in accordance with the originally stated objectives or genuinely intends to repay. This behaviour is a feature of opportunism in rural areas. Asymmetric information problems, coupled with problems in monitoring and enforcement, increase the risk of moral hazard. After signing a loan contract, the borrower may subsequently engage in behaviour detrimental to the interests of the lender.

Given the importance of the risks associated with agricultural activity, banks are not very involved in financing the agricultural sector. Over the period 2013–2015, the sector received only 2.61 per cent of the credit granted to the economy (BCEAO, 2015). Production credits are mainly granted to industrial farmers capable of producing guarantees, with priority given to cash crops, which are organised sectors where production revenues are totally controlled by a centralised sales network.

### Evolution of the agricultural financing paradigm

Agricultural finance policies in West Africa can be categorised in four major periods:

#### Agricultural credit policies (before the 1970s)

Since independence, the economy of West Africa has been essentially based on agriculture. In order to meet both the imperatives of food self-sufficiency and those of the international market, which had to provide the

foreign exchange needed for development, the sector had to be modernised. But due to the low monetarisation of the economy and the practice of subsistence agriculture, most of the peasants did not have the means to finance modern equipment and inputs. Banking channels were therefore needed to play this role. However, the commercial banks at the time preferred to intervene in the trading economy. Therefore, banks entirely devoted to the agricultural sector were created by the States in most countries of the subregion.

Adopting such agricultural financing policies was inspired by Keynesian economic theories. Rural and agricultural underdevelopment was analysed as the result of the inability of poor peasants to save and invest; credit was then used as a necessary lever to initiate the "virtuous circle" of development. Public credit should promote technical change, the financing of innovation and the development of agricultural production. It was also a means of reducing the usurers' hold on rural economies. As a result, low, subsidised interest rates were to stimulate the demand for credit by rural populations and the use of inputs, and support the development of farms.

Governments were not concerned with the profitability of financial institutions. Faced with non-payment, they managed poor-quality portfolios that jeopardised their sustainability. Indeed, many agricultural credits were granted in the context of poorly designed development projects. As a result of these poor performances, both in terms of clientele and the viability of these directed credits, most of these credit programmes were interrupted and several rural development banks went bankrupt. The poor results obtained, combined with the failure of the public structures involved and the generalisation of liberal economic thinking, led to the abandonment of this approach (Lapenu, 2008).

#### Questioning agricultural credit policies (1970–1980)

Neo-classical economists have questioned agricultural credit policies based on Keynesian policies, maintaining that state intervention through the control of interest rates and keeping them artificially low and the support provided by public banks to failing public enterprises limited the functioning and efficiency of the financial system. These practices contribute to low savings mobilisation and government levies detrimental to investment. The difficulties encountered by agricultural credit programmes during this period reinforce this theoretical criticism: losses linked to unpaid loans

are considerable, many agricultural credit institutions are in difficulty, and the entire financial system is highly dependent on external aid.

The track record of development agencies heavily involved in agricultural financing highlights the mixed impact of these credit programmes. Evaluations show that this approach has helped some developing countries to improve their agricultural yields in the short term. However, these studies also highlight many negative effects of these credit programmes. More generally, the size of the volumes of financing disbursed is not correlated with a significant and systematic increase in agricultural productivity and income. In addition, the savings capacity of rural households has not increased and the hoped-for "virtuous circles" of private investment remain virtual. In many cases, state-owned agricultural credit institutions have compromised the development of private financial institutions. The informal sector that these policies aim to reduce remains very active. The public institutions created to spread credit in rural economies are proving to be weakly effective. The capital mobilised reaches only some of the farms, the institutions are poorly managed and lead to losses and embezzlement, repayment rates are low, and little attention is paid to savings mobilisation. All this compromises the viability of financial institutions, as does the political use that is often made of them. In sum, the benefits achieved have largely failed to achieve the objectives of increasing rural incomes, asset formation and rural poverty reduction, among others.

At the beginning of the 1980s, financing policies will change as a result of the debt crisis in developing countries. In order to overcome the difficulties, it is recommended to remove all constraints limiting the development of financial markets. In West Africa, this liberalisation has resulted in the restructuring and reorganisation of the banking sector (privatisation, liquidation or restructuring of public banks, rationalisation of interest rate policies, devaluation of the CFA franc, regional financial integration, etc.), the introduction of new regulations and the emergence of institutional innovations in the area of decentralised financing.

#### Emergence of rural financial markets (early 1990s)

With the rise of liberal theories, public intervention in the promotion of access to financial services for populations excluded from them has been strongly criticised. The inability of the interventionist logic to take into account realities, its cost and finally its inefficiency in



the face of real needs have been widely pointed out. The trend towards regulation by the market as the better vector of social justice than public action has therefore naturally imposed itself. Credit is a financial operation that meets banking requirements. It must be repaid and the risk covered by material guarantees: buildings, equipment, property deeds, stocks, herds, etc. The interest rate must at least cover management costs and risks and, if possible, make a profit. The objective is no longer to promote sectoral credit, but to foster the development and fluidity of a rural capital market in which "rural credit" is no longer just one of many financial instruments, constituting a less constrained, sustainable, more widely developed system of global financial intermediation, linking households to the macroeconomic sphere.

This new paradigm, while based on the needs of farmers, focuses on improving the supply of financial services, using financial market principles to provide not only credit but also other financial services to the rural world. The system promotes financial intermediation, which improves the provision of resources to investors via the savings collected. Hence there are no longer any specific credits aimed at the poor or loans at subsidised rates. The interest rate served on financial operations is a matter of matching market supply and demand.

This paradigm is seen as a means to enable more efficient financial market development and integration rather than market segmentation policies. Financial market efficiency ensures the availability and productivity of production factors, while promoting inter-temporal resource allocation and risk management. Thus, for the followers of this school, financial development promotes economic development, not state interventionism in the financial sphere.

According to the neoclassical economic theory underlying this approach, for the market to function efficiently, the price must be able to vary according to supply and demand. This is why interest rates must be liberalised. This interest rate must cover the costs of the resource and the financial transaction. Also, it is argued that the free functioning of the market will favour the allocation of financial resources to those agents and activities with the best capacity to make them profitable. This is the optimal allocation of the resource.



Financing agriculture in West Africa is still difficult.

Photo: Arne Hoel/ World Bank

The shift from agricultural credit to rural financial markets has led to a rarefaction in the supply of agricultural financing. The agricultural producers' organisations that are developing in many West African countries are acutely confronted with this paradox. They are solicited by their members to meet their financing needs. The integration into the rural financial market predicted by theory is struggling to be achieved and the partnership between the agricultural and financial sectors is far from being spontaneous. At the same time, profitable agriculture in structured channels demonstrates financial needs that microfinance is unable to meet. These include investments in heavy agricultural equipment requiring substantial medium- or long-term loans. As a result, these reforms have not produced the expected results, particularly the substantial increase in agricultural growth to reduce rural poverty. The private sector has not moved into the vacant spaces left by the state, and agricultural markets have not developed as anticipated by the macroeconomic stabilisation and structural adjustment measures put in place.

#### **Back to the state's public intervention in agriculture (from the 1990s onwards)**

In this increasingly complex agricultural financing landscape, following the Addis Ababa Conference on Financing for Development in July 2015, the call for the public sector to build effective agricultural financing strategies has become louder. In West Africa as a whole, recent studies reflect an overall increase in the amounts mobilised for agriculture. This increase is not attributable to a single group of actors, but results from a joint effort by governments, donors and the private sector.

The commitments made by African governments relate to legislative and fiscal measures

favourable to the private sector and aimed at improving the business environment, as well as the construction of community infrastructure to improve market access, storage and the valorisation of agricultural production, rather than to amounts of public spending on agriculture. There have also been changes in the institutional landscape of financing that are reflected in an evolution of the instruments used and an increasing orientation of public funds in financial packages on attracting private investment. Thus, African states and donors have gradually become involved in financial instruments such as guarantee funds, investment funds, banking integration in agricultural value chains and the establishment of agricultural engineering companies.

#### **On the right way?**

Public investment in agriculture is necessary to provide the public goods that can enhance the dynamism of the agricultural sector. Syed and Miyazako (2013) show that investment in public goods has much higher returns than other expenditures. Jacquet and Guillermo (1988) argue that in most regions where agricultural production is efficient and better developed, capital and input intensity levels are higher. They are supported by Hoff and Stiglitz (2002), who argue that in the search for the best productivity, capital accumulation becomes indispensable. Individuals with few or no assets will be relatively unproductive compared to what they would produce if more wealth allowed them to work under more stimulating conditions. These authors hold that agricultural intensification by capital is more suitable for increasing productivity; hence state intervention to allocate enough funds to the agricultural sector in order to reduce poverty appears to be the right way.

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## How science on-the-go can enhance development efforts

Development projects rarely play by the book. Unpredicted challenges and opportunities can emerge in any project – as the world painfully observed in 2020. ‘Accompanying research’ embeds continuous, systematic research in development work. In this approach, scientists and change agents work hand in hand on a shared vision: stronger impacts for both research and practice. Our authors give an account of experience from Malagasy-German research cooperation.

By Jonathan Steinke and Alexandra Konzack



Beneficiaries of a nutrition security project in Madagascar join researchers to discuss expected impacts of a range of potential interventions. Photo: Sarah Tojo Mandaharisoa

Development projects frequently cooperate with researchers to legitimise their activities. For example, academic mid-term reviews and post-project evaluations are common practice. By collecting lessons learnt and advancing institutional knowledge, these types of cooperation between science and practice are vital for the design of follow-up projects. In running projects, however, necessary adaptations are often based on ad-hoc decisions by the project team, rather than on systematic inquiry. Permanently embedding research within development projects has the potential to save resources and strengthen impacts.

Yet, as much as every intervention project is unique, there is no standard approach to accompanying research. Currently, researchers at Humboldt University Berlin (Germany) and Université d’Antananarivo (Madagascar) are piloting accompanying research within a project for food and nutrition security in Madagascar led by Deutsche Gesellschaft für Inter-

nationale Zusammenarbeit (GIZ). This pilot project, named *Accord-M*, aims at integrating systematic research into all phases of the development project. The research component enables the project to evolve over time, based on empirical evidence.

### What’s new about accompanying research?

In contrast to extant research-in-development approaches, accompanying research implies continuous, mutual interaction between the on-the-ground activities of the development project and the research agenda. This means that neither the intervention project nor the research project are fully pre-designed: ideally, their respective activities are informed by the other.

The idea behind accompanying research is to provide scientifically grounded advice on all

steps of project implementation. This includes a thorough exploration of the target context prior to the design of interventions. Once the intervention project kicks off, research closely observes implementation, for example, the context-based modification of ongoing interventions, or participation barriers experienced by the target group. Although researchers take a passive, observing role in the development project, closely monitored experiments, for example around individual intervention design, are possible.

One key characteristic of accompanying research is the execution of small, self-contained studies on emerging topics identified by the development project. At regular intervals, accompanying research delivers outputs that are meant to inform the decision-making of the cooperating change agents. This allows quickly and flexibly responding to knowledge needs identified ‘along the way’. But it also requires a good amount of ongoing communication and coordination from both sides.

### A toolkit for mutual learning with development projects

Despite the need for flexibility, agreeing on a research roadmap is crucial for clear communication between all stakeholders. While every accompanying research project will need to design its methodology to match the intervention project, it may be useful to build on the experience of similar collaborations. In our case, the research roadmap for accompanying a project that aims at improving the nutritional status of women and children in Madagascar follows three major stages: first, informing the design of the intervention package by an in-depth analysis of local needs and opportunities, second, informing practical implementation by observing intervention roll-out, and third, after at least two years of implementation, a preliminary, participatory impact assessment and cost-effectiveness analysis.

In all stages, the project combines quantitative and qualitative methods of socio-economic



### Selected research topics from *Accord-M*

Before implementation of development interventions	<ul style="list-style-type: none"> <li>• Target group's problem perception</li> <li>• Local positive deviance in food and nutrition security</li> <li>• Participatory ex-ante impact assessment</li> </ul>
During early implementation	<ul style="list-style-type: none"> <li>• Adaptation of interventions by beneficiaries</li> <li>• Unintended negative side-effects</li> <li>• Trade-offs experienced by target group</li> </ul>
Final year of implementation	<ul style="list-style-type: none"> <li>• Spill-over effects to non-beneficiaries</li> <li>• Effects beyond the targeted food and nutrition indicators</li> <li>• Cost-effectiveness analysis</li> </ul>

research. One example is the search for 'positive deviant' households in the intervention region. Using survey data collected by the intervention project, we identified individual households with 'surprisingly' strong food and nutrition security indicators. In the next step, researchers revisited these positive deviants for in-depth interviews, with the aim of identifying uncommon practices that may contribute to their superior situation. This tool helps to outline interventions that are likely to be viable and effective in the targeted context. Another example of how accompanying research can inform the design of the intervention package is participatory ex-ante impact assessment. In this process, a diverse group of future project beneficiaries express their priorities regarding potential project impacts. Then, they discuss and rate expected intervention impacts against these criteria. The insights generated help the development project to prioritise interventions with most positive impact expectations in the most important criteria.

Regular communication between all project stakeholders is key: for researchers to be aware of emerging research questions, and for practitioners to receive new scientific insights in a timely, understandable, and actionable manner. To guide the research agenda, we have established an 'advisory board' that convenes three times a year, reflecting on findings and discussing the next steps. This board includes members of the research team (from Germany and Madagascar alike), the intervention project and the funding organisation. In addition, it is joined by an external academic expert, who was invited to review all research activities and outputs and to provide unbiased, independent feedback and recommendations.

### Inherent tensions and opportunities

Along our ongoing project, we have encountered some tensions that challenge the routines of conventional research projects. One challenge, for example, consists in the intervention

project's need for quick outputs, which can, sometimes, be hard to align with established standards of scientific rigor. After all, proper socio-economic research demands time-consuming development of research methods, preparation of fieldwork and processing of collected data. We try to speed up the feedback process by delivering preliminary results as quickly as possible, from a slimmed-down set of methods. Fully triangulated results from multiple methods are presented later.

Another trade-off that requires consideration relates to the simultaneous needs for flexibility and planning security. Many researchers pursue long-term scientific projects, such as the development of a methodology across multiple research projects. PhD students, who may invest time and effort into acquiring methodological skills, need to be sure the research needs and priorities will not strongly change in the meantime. To maintain the ability to accommodate emerging knowledge needs while granting adequate planning security, we decided to assign pre-agreed lines of research to PhD students. Post-doctoral staff and graduate students focus on smaller, rapid studies in response to the intervention project's expressed needs. Involving Master's students from both Université d'Antananarivo and Humboldt University as researchers on self-contained topics has so far proven a successful approach.

Lastly, scientific independence is non-negotiable. This means that early in the development of an accompanying research project, discussions should emphasise the mitigation of possible conflicts of interest. In our case, funding for our research originates from the same source as funding for the intervention project, i.e. from GIZ. We believe that this kind of constellation is likely to be typical of accompanying research, where the donor of an intervention project is interested in increasing its effects. We have tried to minimise conflicts of interest by prohibiting double roles between the two projects: no member of the research team can take up responsibilities in the inter-

vention project, and GIZ's role in the research activities is limited to logistic support. In addition, while the intervention project raises questions that emerge from ongoing practice, the research project is free to select methodological approaches, interview partners or case studies. The leading role of Université d'Antananarivo in the research activities on-the-ground has shown to strengthen this independence. Detecting signs of insufficient scientific independence and suggesting coping strategies may also fall within the duties of external advisors acting as a 'critical friend'.

### A process of continuous learning

Accompanying research thrives on flexibility and constant exchange between researchers and practitioners. In this respect, we are continuously learning to improve not only our research, but also the meta-methodology of accompanying research. To suggest best-practice for accompanying research, we are planning to evaluate our pilot cooperation systematically. Communication, power distribution and conflict management are major topics for thorough examination and scientific analysis. In this article, we make suggestions on how to address some identified tensions. Other challenges and opportunities may need a closer look and profound scientific exchange after project end.

More than just a tool for advising development projects, accompanying research can also hold a mirror up to science. The close interaction with development practice has the potential to challenge established scholarly wisdom. Researchers may benefit from new perspectives that open up during accompanying research. Finally, highlighting best practice in development projects through scientific analysis can help to up-scale identified successes in the future. We look forward to further applications and development of the approach and welcome lively exchange with researchers, donors and development practitioners.

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# Business challenges for disabled poor women in rural Bangladesh

Women with disabilities living in rural areas are the most disadvantaged and oppressed people in Bangladesh. This article centres on a case study looking at business challenges that women entrepreneurs with disabilities experience in rural areas. Our author argues that a more gender-friendly environment and better consideration of disability during policy design and implementation could help disabled women to be more productive and successful entrepreneurs, and to overcome social and financial hardships.

By Debashis Sarker

Bangladesh has a population of more than 165 million, 6.94 per cent of whom have some form of disability. A significant number of poor people with disabilities live in rural areas, where they face negative attitudes based on stigma and prejudice and are treated as a burden on their family and society. This is especially the case for women with disabilities, who generally have poor health, inadequate nutrition and less access to medical services. The majority of these women lack basic education, and it is hard for them to find employment opportunities. In many cases, they are ostracised by their families. They have reduced marriage prospects and suffer higher rates of abuse and violence. Although different disability policies and acts are in place in Bangladesh, people, and especially women, with disabilities are yet to be socially and economically empowered. To tackle this problem, some Non-Governmental Organisation Microfinance Institutions (NGO-MFIs) in Bangladesh recently started providing microfinance to economically active people with disabilities, particularly women, with poor access to formal financial services. These schemes have yet to prove their effectiveness.

## The study

The case study “Business Challenges for Poor Women with Disabilities in the Rural Areas of Bangladesh” was conducted in the North of the country in association with the NGO Thengamara Mohila Sabuj Sangha (TMSS). Five economically active women with disabilities were interviewed who were involved with income generation activities – mainly in small businesses. Their average age was 30 years. Two women had physical disabilities, two had multiple disabilities (physical, poor vision, hearing impairment), and one was blind. Two of them had no education, two had primary school education, and one had high-school education. They were involved with selling chickens, rearing goats, and dress and cap making.

Salma Akhter (the name is a pseudonym), aged 22 years, has physical and hearing disabilities, and her speech impairment deters her from going out and meeting up with people. She completed high school but was unable to go on studying because of her disabilities. Her family wanted to arrange marriage for her, but she rejected this, fearing she could have children with disabilities. Salma Akhter wanted to consult doctors for health treatment but could not afford that. She then decided to start her own business to become financially independent. She needed credit for her venture and, despite her disabilities, and with the strong support of her family and neighbours, she received support from a local microfinance institution and started a dress-making business. Her physical disability kept her from working long hours, while her impaired hearing ruled out her visiting the local market to sell her products, making her dependent on a wholesaler buying them. The intermittent nature of her business meant there was no regular income. She nevertheless had to make weekly debt repayments.

## The problem of credit

To do business in the area studied, women with disabilities need capital to purchase raw materials for production. But accessing capital is hard for them as they are mostly living in poverty. Their families typically cannot provide money or even borrow it themselves. Moreover, there is a scarcity of financial institutions, especially banks. Local money lenders charge higher interest for credit. The other option is to seek credit from NGO-MFIs, whose interest rates are still high, but lower than those of the local money lenders.

A blind woman addressed in an interview initially fared worse accessing credit, being rejected by a credit officer because she had no education and could not sign the credit documents. Finally, thanks to the credit group member’s positive endorsement, she did re-

ceive credit. In such cases, when credit is provided, it is typically with harder conditions, such as stricter repayment and tougher credit checks. Another participant in the interview stressed that MFI’s staff were generally particularly reluctant to award credit to women with disabilities due to stigma and prejudice.

## Limited business opportunities and market access

The study found that women with disabilities who access NGO-MFI financial services were doing business, but that poor business opportunities limited income levels. Most of the businesses in the study area were seasonal businesses. “Once I produce dresses, a middleman comes and picks them up. He sometimes returns to order more products. I can’t sell throughout the year – most products are seasonal. So, we cannot generate enough income for our living,” said Salma Akhter.

Although the participants in the study were involved with income generation activities, they had less access to existing markets to sell their products and fewer opportunities to collaborate with the value chain owing to their disabilities. Not being able to access the market directly, the women had no choice but to sell the finished products to middlemen, who usually also set the prices. For example, one woman with a physical disability running a poultry business was offered prices below normal by wholesalers. Her disability made it hard for her to visit local markets and interact with other businesspeople.

## Financial literacy, business training – and willingness to take risks

Business success depends heavily on financial literacy, especially on money management skills. Only two of the participants in the study had received business skills training.





Salma Akhter (pseudonym), a woman with multiple disabilities from the rural study area.

Photo: Debashis Sarker

Inadequate or lacking education limited the participants' capacity to use credit effectively and to achieve business success. The two participants who had received training said they did not understand the complex training materials, which were neither disability-friendly nor suited to the needs of the different types of disability.

Due to limited mobility and unfriendly transport facilities, the women usually conduct businesses from home, which further limits their potential to earn more income. It incurs costs, reduces production and disrupts communication with other businesspeople and existing markets. Moreover, it raises dependence on wholesalers or other middlemen.

The study further found that women with disabilities were less willing to take risks, especially in diversifying their businesses, e.g. starting another business alongside their existing one. This was mainly due to long-term deprivation and exclusion from society, which leaves such women in a more vulnerable position.

### Health issues

The women believed they could have been more successful if they had had no health issues. When they got sick, they would mostly

depend on family members, and often, these became reluctant to extend their support. Hence addressing health issues poses a serious barrier to women with disabilities to being involved with income earning opportunities.

Running any business as a sole trader is challenging, especially when the person gets sick. Women with disabilities are more likely to be unable to work, while their health and social isolation makes them more prone to get sick, meaning they need a support network and access to healthcare. Besides helping their family members financially with the income they had earned, two of the participants were able to afford purchasing medicines and visiting a doctor thanks to their business activities.

### Looking ahead

The study suggests that amongst disadvantaged persons in rural Bangladesh, women with disabilities who were perceived as incapable of engaging in business activities showed that they could be self-employed and contribute to society, challenging the notion that women with disabilities are not 'worthy'. Rather, they are capable of realising their potential when they get the opportunity. However, they require a disability-friendly enabling environment to achieve their full

potential and contribute to their livelihoods and the rural and national economy.

Since women with disabilities are often kept hidden by their families in rural areas, local political and community leaders could be engaged to identify and provide services to them. Accessing such services would enhance their capacity to engage with people outside their home and build social connections. To empower people with disabilities, it is important to build social networks, especially in rural areas, so that they can meet each other, share their stories and motivate each other for their livelihoods. Sharing their stories locally and globally can inspire others who are willing to do something. Moreover, networks outside the family could eventually support them in building confidence and succeeding in their businesses.

This study further found that since microfinance projects for people with disabilities are mostly funded by donor organisations, the sustainability of these programmes is always a concern. Once funding is over, the project will be no more. Thus, providing sustainable funding for greater financial inclusion of women with disabilities remains a critical aspect.

Especially in the rural areas of Bangladesh, the government should take necessary steps to make sure that women with disabilities can access financial institutions. Moreover, it should provide support to women with disabilities so that they can access existing markets to sell their products.

Women with disabilities need access to education, business-related training and information allowing them to make informed decisions about business activities. Various disability and rural development policies have been formulated in Bangladesh for empowering women with disabilities, but most of them are yet to be implemented effectively. A particular focus on gender and disability inclusion is needed for rural areas to support the development and empowerment of these women.

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