

Sustainable Land Management: Challenges, Success and Future Opportunities for Tanzania

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Abstract

This paper was presented at the United Nations Development Program's Sustainable Land Management Project feedback conference in Moshi, Tanzania. The conference was held to discuss lessons learnt from the Government of Tanzania and the United Nations Development Program's Project on Reducing Land Degradation on the Highlands of Kilimanjaro Region. It summarises the challenges and successes of implementing the United Nations Convention on Desertification and Degradation in Tanzania and in the rest of the world, notably, unsustainable land management practices, deforestation and soil erosion, caused by a demand for agricultural land as the world's population rises. It notes that limited funding for sustainable land management has limited the effectiveness of projects to address challenges. It also summarises new opportunities for funding that can make a bigger impact, such as the Green Climate Fund and Payment for Ecosystem services, which promise to allocate more funding to sustainable land management projects in the future.

Introduction

Land is a vital resource for producing food and other ecosystem goods and services such as conserving biodiversity, regulating hydrological regimes, cycling soil nutrients, and storing carbon. Land forms the basic building blocks of our lives and economies, yet the valuable services provided are often undervalued and exploited. Mainly due to population growth and the need for agricultural land, demand for productive, fertile land is spiralling out of control, with an estimated 24 billion tons of fertile soil lost due to erosion in the world's croplands each year, and more than 20% of the planet's land is considered degraded.

According to many estimates 70% of African land is already degraded to some degree and land degradation affects at least 67% of the entire African population. Tanzania has experienced land degradation and soil erosion, due to widespread deforestation, extensive overgrazing, wildfires, slope cultivation and soil erosion. Tanzania has addressed land degradation in its policies and laws, although there are still some shortcomings due to poor sectorial linkages in the policy development process, lack of awareness of the implications of policies among community groups and contradictions between official and customary laws and practices. Tanzania's institutions are struggling with limited human resource capacities due to limited training and a lack of information and equipment needed for effectiveness and an information gap, due to weak links between research and extension services. These issues are compounded by the absence of a comprehensive monitoring system and a sectorial approach limiting opportunities for sharing experiences among projects and programmes supported by different sponsors.

The United Nations has officially recognized the interrelationship between climate change, land degradation and biodiversity, highlighting the importance of integrating these challenges into strategies and programmes in all three Rio Conventions. There are also several funding sources for climate change mitigation and adaptation, which has been closely linked to sustainable land management. Sources of funding to explore include the recently launched Green Climate Fund (GCF), the Global Environment Fund Payment for Ecosystem Services (GEF- PES), Biodiversity Offsetting and Ecological Infrastructure Investment.

Acronyms

UNCCD	United Nations Convention to Combat Desertification
GCF	Green Climate Fund
GEF	Global Environment Facility
PES	Payment for Ecosystem Services,
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
SLM	Sustainable Land Management
IFAD	International Fund for Agricultural Development
UNFCCC	United Nations Framework Convention on Climate Change
UN	United Nations
CDM	Clean Development Mechanism

NAPs	National Action Program
RAP	Regional Action Program
SRAP	Sub-regional Action Program
TPN	Thematic Program Network
NSGRP	National Strategy for Growth and Reduction of Poverty
GM	Global Mechanism
EU-ETS	European Union Emissions Trading Scheme
LDCs	Least Developed Countries
AFOLU	Agriculture, Forestry and Other Land Use
GHG	Greenhouse Gases
UN-REDD	United Nations - Reducing Emissions from Deforestation and Forest Degradation
COP	Conference of Parties
SDG	Sustainable Development Goal
OECD	Organisation for Economic Cooperation and Development
NAMA	Nationally Appropriate Mitigation Actions

Global Context of Land Degradation

Land is a vital resource for producing food and other ecosystem goods and services such as conserving biodiversity, regulating hydrological regimes, cycling soil nutrients, and storing carbon. Indeed, the soil's nutrient cycling provides 51% of the total value (US\$33 trillion) of all ecosystem services' provided each year, forming the basic building blocks of our lives and economies. (UNCCD, 2014)

Demand for productive, fertile land is spiralling out of control, with an estimated 24 billion tons of fertile soil lost due to erosion in the world's croplands each year, and more than 20% of the planet's land is considered degraded. Broken down further, global assessments show that more than 20% of all cultivated areas, 30% of natural forests, and 25% of grasslands are all undergoing some degree of degradation. (UNCCD, 2014)

Land Degradation in Africa

Africa is particularly vulnerable to land degradation and desertification due to its geographic conditions, with at least 45% of its landmass categorized as dry lands, and 38% of this land being classified as hyper-arid or desert land. Arid, semi-arid, dry sub-humid and hyper-arid areas support about 50% of the continent's population. (Kigomo, 2003)

An estimated 70% of African land is already degraded to some degree and land degradation affects at least 485 million people or 67% of the entire African population. (UNEP, 2006)

Land Degradation in Tanzania

Tanzania is located in the Great Lakes Region, with four distinct ecosystem types: forest, covering about 33.3 million hectares (27% of the total land area); cropland/natural vegetation mosaic covering 39 %; shrub lands, savannah and grasslands covering 27%; and, wetlands or water bodies covering the remaining 7 % (World Resources Institute 2003). Tanzania is not as arid as other countries in East Africa, and receives an annual precipitation of 973 mm. Rainfall generally declines from the north to the south, and almost half of the country receives less than 750mm: Dodoma, Singida and Shinyanga regions, Mbulu District and the lower areas of Arusha, Moshi and Pare District to the north and of Iringa to the south all receive less than 800 mm of rain per annum. (UNEP, 1977)

According to the 5th National Report on the Implementation of the Convention on Biological Diversity, Tanzania has lost at least one-third of important ecosystems over the past few decades undermining livelihoods of many people who depend directly on them. Forests occupy 55% of the total land area (about 48 million ha). Tanzania has lost about 38% of its forest cover at an annual rate of about 400,000 ha and if this rate escalates coupled with demographic and economic pressures, the country may deplete its forest cover in the next 50-80 years. The report further states that more than half of inland water ecosystems (rivers, lakes and dams) have been degraded and are continuing to be threatened in terms of changed water regimes, pollution and conflicts over resource use. Similarly, signs of environmental degradation and decline in coastal and marine biodiversity are becoming more obvious with the country losing about 44,000 ha of mangroves over the last 30 years (1980-2010). (United Republic of Tanzania, 2014)

Economic impacts of Land Degradation

The United Nations Environment Programme (UNEP) estimated that the global direct cost of desertification owing to lost agricultural production was \$26 billion per annum (UNEP, 1980).

Global Impacts

According to the Food and Agriculture Organization (FAO), the cost of land degradation currently reaches about US\$490 billion per year, directly impacting the health and livelihood of 1.5 billion people. Notably, 40% of the world's degraded land occurs in areas with the highest rates of poverty, mainly in Sub-Saharan Africa and Southeast Asia. (FAO, 2011)

Other estimates have been made that the direct costs of desertification could cost a country between 1 – 10% of its Agricultural Gross Domestic Product. (UNCCD, 2013)

According to a report by the UNCCD (2014), the global consequences of land degradation will also have serious social and economic impacts due to food and water insecurity. Predictions include:

- A 30% increase in food prices over the next 25 years, due to a 12% decrease in global food production, caused by land degradation
- A 10 – 20% increase in the number of people at risk of hunger as a result of climate change due to added impacts of land degradation by 2050
- Desertification of up to 50% of Latin America's agricultural land by 2050
- Displacement of up to 135 million people as a result of desertification by 2045

Africa

Some attempts to calculate cost of land degradation in Africa have been made: in Africa; estimates from the late 80s and 90s show that Burkina Faso could lose 9% of GDP, Niger could be losing 8% of GDP as of 2011 and Kenya could be losing 0.7% of GDP solely due to the consequences of overgrazing as of 2010, and while Ethiopia would lose 2% of Agricultural GDP annually. (Kirui & Mirzabaev, 2014)

In Sub-Saharan Africa the direct and indirect impacts of land degradation on crop yields are serious; in some countries productivity has declined in over 40% of the cropland area in two decades while population has doubled. Further, the productivity of some lands has declined by 50% due to soil erosion and desertification. Yield reduction in Africa due to past soil erosion may range from 2–40%, with a mean loss of 8.2% for the continent. (UNEP, 2009)

Drivers of Land Degradation

Global

Productive land is under pressure due to population growth, climate change, unsustainable land use, land degradation and the growth of urban areas. Therefore, the biggest proximate cause of land degradation and desertification is the expansion of agriculture. 80% of deforestation, for example, is driven by the need to expand the world's croplands and the search for grazing land. This is exacerbated by growing demand for food, fodder and agricultural raw materials for industrial and energy use. (UNCCD, 2014)

By 2030, it is expected that the demand for food, energy, and water is expected to increase by at least 50%, 45% and 30%, respectively, even though the world's agricultural lands are projected to experience significant declines in productivity. (UNCCD, 2014)

Underlying drivers of land degradation can be classified as political, economic, technological, demographic and natural. There is also a strong link between climate change and land degradation.

Political drivers: Reconciling short term political goals and mandates with long term SLM goals is a great challenge both globally and in Africa. Furthermore, both communism and intense capitalism drove economic growth through natural resources extraction, and did not integrate SLM, entrenching unsustainable land management practices as a means to greater prosperity. This can be seen in the policies and laws that were and continue to be developed.

Economic drivers: Natural resources are under-valued, with the externalization of the costs of production and consumption. As economies continue to grow, consumption increases and this places more pressure on land and other natural resources, which is exacerbated by the free market economy and trade liberalization. Finally, small scale agriculture is not profitable, driving farmers to maximize output from their lands or to expand into new lands.

Technological drivers: While improvements in technology has greatly increased agricultural productivity, it has also increased the rate of forest clearance for agriculture and pastoralism, causing soil erosion and degradation, while irrigation has caused salinization of formerly productive land, and the excessive use of fertilizers has led to soil nutrient depletion and long term declines in the soil's agricultural productivity.

Demographic drivers: According to the UN World Prospects (2012), the world's population is expected to rise from the current estimated 7.2 billion to 9.6 billion by 2050, with more than half of that rise in Africa alone. This will require the conversion of approximately 6 million hectares of agricultural production every year until at least 2030 to satisfy growing demand and a 60% increase in agricultural productivity and 100% in developing countries by 2050 to overcome hunger and food insecurity, based on current land usage and management patterns. (UNCCD, 2014)

Land degradation is also closely linked to global climate change and loss of biodiversity. Increased global warming could lead to extreme events such as floods and droughts occurring with greater intensity and frequency, making already stressed lands further degraded. (Bai et al, 2006)

Africa

Africa is particularly vulnerable to land degradation and desertification due to its geographic conditions, given that 45% of the continent's landmass categorized as drylands, with a significant portion being classified as hyper-arid or desert land. Furthermore, only 10.6% of Africa's arable land has good quality soil, covering 3 100 million ha and supporting about 400 million people. The poorest soils, which are highly acidic, impermeable, frequently waterlogged, easily accumulate salts, and require major investments to manage cover 11 200 million ha and support about 200 million people (23%) of the population (UNEP, 2006). These soils are prone to erosion and low productivity.

A growing population, declining productivity of the land, scarcity of land and poverty are pushing more people into marginalized areas that are more vulnerable to land degradation. Disparities in land distribution, with concentrations of people on limited portions of often unproductive land play a major role to degradation and deforestation as people begin cultivating marginal land that is vulnerable to degradation and desertification. (UNEP, 2011)

The key proximate causes leading to land degradation include non-sustainable agricultural practices, overgrazing and overexploitation of forest and woodland resources, while the major underlying causes are believed to be population pressure, poverty and market and institutional failures. (Kirui & Mirzabaev, 2014)

Unfortunately, a large number of people in sub Saharan Africa rely directly on land and natural resources for their livelihoods. 64% of the population lives in rural areas, and 59% are dependent on agriculture, hunting, fishing or forestry for their incomes. Furthermore, 95% of agriculture is rainfed, and many countries' GDPs are directly linked to the amount of rainfall they receive each year. (UNEP, 2011)

Tanzania

Agriculture is the mainstay of the economy, accounting for 45% of GDP, 60% of export earnings and employs 80% of the population. The country has 95.5 million hectares (ha) of land, of which 44 million ha are classified as arable, though only 27% of this arable land is under cultivation. Out of 29.4 million ha of land suitable for irrigation, only 0.34 million ha currently is. Agriculture is mainly subsistence, with about 70% of farmers relying on the hand hoe in a rainfed agricultural system. (FAO, 2014.)

The main drivers of land degradation in Tanzania are explained by the heavy reliance on natural resources for income, mainly; the invasion of water sources/catchment areas by livestock keepers/herdsmen; illegal human activities related to agriculture and livestock keeping, settlement along the slopes of mountains, on top of mountain ranges, in river valleys and around water sources; deforestation and massive tree cutting for firewood, charcoal and house construction in urban areas; unsustainable small and large scale irrigation projects and programmes and ; inadequate accurate data and information at district level regarding water sources and uses. (Mongi, 2008)

The Kilimanjaro Region

The Kilimanjaro ecosystem provides provisioning services, cultural services and supporting services (soil formation, nutrient cycling and primary production) but is experiencing an extensive process of degradation and deforestation, compromising the ability to provide these services.

Degradation in the Kilimanjaro region can be distilled into four key barriers facing SLM in the region: limited livelihood opportunities outside the natural resources, weak incentives for adoption of SLM, weaknesses in the policy, planning and institutional environment that influence SLM, and, inadequate skills at all levels required for promoting and/or adopting SLM. (UNDP, 2010)

Response to Land Degradation and Loss of Ecosystem Services

Global

The UNCCD came into force in 1996 and was the first global response to the issue of land degradation and desertification. In 2007, Parties to the UNCCD developed their Ten - Year Strategy, recognizing that addressing land degradation and desertification would serve to improve livelihoods of affected populations, restore degraded ecosystems and generate global benefits through effective implementation of the Convention.

At the Rio+20 Conference, world leaders recognized that desertification, land degradation and drought, were challenges of a global dimension that affected the sustainable development of all countries and undertook to strive to achieve a land degradation neutral world and committed to monitor, globally, the status of land degradation and to reclaim degraded lands in arid, semi - arid and dry - sub - humid areas.

Africa

All African countries are Party to the UNCCD. Most African countries have developed and submitted National Action Programs (NAPs), including Tanzania. Currently, many African countries are preparing for the alignment of the National Action Programs to the 10-year strategy of the UNCCD.

African countries created five Sub-regional Action Programs (SRAPs) and a Regional Action Program (RAP) to facilitate cooperation on land degradation. The current African RAP outlines were adopted at a ministerial level in 1999 and compose six Thematic Program Networks (TPNs) that concern integrated water management, agro-forestry and soil conservation, rangelands, ecological monitoring and early warning systems, new and renewable energy sources and technologies, and sustainable agricultural farming systems. (UNCCD)

Tanzania

Efforts to combat land degradation and conserve water catchment areas and related ecosystems in Tanzania are linked to the overall policy and legislation geared towards poverty eradication and sustainable development.

SLM is critical to the success of Tanzania's development goals, as outlined in the Tanzania Development Vision 2025, and is supported by a solid and comprehensive framework of laws and policies, which have the clear overall policy objective of achieving sound sustainable development by reconciling economic growth and conservation of resources while spearheading social development. The Rural Development Strategy of 2002 acknowledges that pro-poor growth is heavily dependent on the ability of rural populations to secure the natural resources they need to sustain their livelihoods. (United Republic of Tanzania, 2012)

The National Strategy for Growth and Reduction of Poverty (NSGRP) of 2005 demonstrates the close relationship between reduction of Poverty and the sustainability of the productive sectors, particularly agriculture, which employs majority of the population.

According to Tanzania's National Report for the United Nations Conference on Sustainable Development, Rio+20, Tanzania has implemented a number of actions and programmes, and in particular; the continuous review of sectorial policies to address sustainable development; the preparation of the National Environmental Policy (1997); the formulation of a National Energy Policy (1993 and revised in 2003); formulation and implementation of Women and Gender Development Policy (2000) and; the signing and ratification of several global and regional conventions of relevance to the environment and sustainable development among other poverty reduction strategies. Implementation of the Environmental Management Act of 2004 involved the establishment of environmental units in all sectorial ministries to address issues of environmental sustainability in line with other development initiatives, while the National Strategy on Urgent Actions on Land Degradation and Water Catchments restricts cultivation in the steep slopes in the highlands parts of Tanzania. (United Republic of Tanzania, 2012)

Policy and Institutional Deficiencies

Despite the fact that the country is party to international environmental and other sustainable development commitments and has been implementing laws and policies, achievement of such efforts have been constrained by poor sectorial linkages in the process of policy development and implementation and the lack of awareness of the implications of policies among community groups as well as contradictions between official and customary laws and practices. (UNDP, 2010)

Tanzania's institutions, struggle with limited human resource capacities due to limited training, "brain drain", lack of information and equipment necessary for them to effectively perform their duties, such as the provision of adequate extension services to support farmers in land use planning and improving productivity and; an information gap, due to weak links between research and extension service leaving findings largely un-disseminated. These issues are compounded by the absence of a comprehensive monitoring system and a sectorial approach that limits opportunities for sharing experiences among projects and programmes supported by different sponsors. (UNDP, 2010)

The Global Financial Challenge for SLM Implementing the UNCCD

Compared to the two other Rio Conventions, the UNCCD has had significant challenges when it comes to financing. It came into force in 1996, but did not immediately establish a separate fund to finance its activities, despite demands from developing countries. In 1997, it established the Global Mechanism (GM) to promote actions leading to the mobilisation and channelling of financial resources to affected developing countries. (UNCCD, 2012)

This lack of funding slowed down implementation activities, leading to increasing demands to make the GEF a source of funding for the UNCCD. At the World Summit on Sustainable Development in 2002, the GEF was called upon to become a financial mechanism of the UNCCD and in October the same year, it designated land degradation as its fifth focal area, establishing it as a financial mechanism of the UNCCD. (GEF,

2010)

During the first round of funding(2006- 2010), land degradation received a total of USD 300 million out of a total budget of USD 3.135 billion. In the next round, (2010 - 2014) it received USD 324 million out of a total of USD 4.28 billion and in the next round, (2014 - 2018) received USD 346 million. (GEF, 2013)

Though these funds are significant, reversing the rapid degradation of natural resources and preserving ecosystem services would need as much as USD 50 billion a year, according to estimates from intergovernmental and major international processes. The UNFCCC estimates that \$200 billion per year will be required by 2030 as additional investment, half of it in developing countries, for new low-emission technologies, if emissions are to be reduced by 25% of 1990 levels. (GEF, 2010)

Clean Development Mechanism

The global carbon market is threatened by a severe supply and demand imbalance, with prices in the major carbon finance market being so low that they do not cover the cost of monitoring and issuance for developers, due to, among other things, restrictions by the European Union Emissions Trading Scheme (EU-ETS) to the purchase of Clean Development Mechanism (CDM) credits from countries other than Least Developed Countries (LDCs) since the end of 2012 and; the economic recession that started in 2008. (World Bank, 2014)

Future Opportunities

Climate Finance and Sustainable Land Management

The United Nations recognises the interrelationship between climate change, land degradation and biodiversity, highlighting the importance of integrating these challenges into strategies and programmes in all three Rio Conventions.

To date, many African countries have not been able to access climate finance, despite evidence demonstrating strong linkages between SLM and climate change adaptation and mitigation, especially in the agriculture, forestry and other land use (AFOLU) sectors, even though farmers and pastoralists can reduce GHG emissions, increase carbon sequestration and maintain carbon stock, increase food production and improve their livelihoods at a low cost. This is largely due to their inability to develop strong proposals on adaptation and mitigation. (UNCCD, 2013)

Below is a brief overview of emerging opportunities for SLM funding:

UN-REDD+ (Reducing Emissions from Deforestation and Forest Degradation)

The UN-REDD was created in September 2008 to assist developing countries to build capacity to reduce emissions and participate in a future REDD+ mechanism. The program has been supporting governments to prepare national REDD+ strategies through 9 pilot National Programmes in Africa, Asia-Pacific, Latin America and the Caribbean, later increasing to 51 partner countries. (UN-REDD, 2014)

Between 2011 and 2015, managed a total of USD 245 373 872 under the UN-REDD Trust Fund of which about 22%, or USD 230 million was allocated to Sub-Saharan Africa. (UN- REDD, 2014)

Tanzania was one of the nine initial pilot countries and was allocated a total of USD 4,280,000. (UN-REDD, 2014)

REDD+ gained important momentum from COP-15 and support for REDD+ continues to grow while the mechanism is negotiated under the UNFCCC. (UN-REDD, 2010) According to the REDDX finance tracking website, total REDD+ finance disbursed as of 2015 is USD 2 042 935, with another USD 26 475 766 committed. (REDDX, 2015) Activities that will be funded under REDD+ include, among others, integrated watershed management; payments for ecosystem services; financial mechanisms related to carbon; development & testing of policy frameworks to slow the drivers of undesirable land-use changes; work with local communities to develop alternative livelihood methods to reduce emissions and sequester carbon and; systems to measure and monitor carbon stocks and fluxes from forest and non-forest lands.

Land Degradation Net Neutrality

The concept of land degradation neutrality was first introduced as “zero net land degradation” in a proposal tabled at Rio+20. This goal or target would be achieved by: (a) managing land more sustainably, which would reduce the rate of degradation; and (b) increasing the rate of restoration of degraded land, so that the two trends converge to give a zero net rate of land degradation. It proposes including land degradation neutrality in goal SDG goal 15: “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss” and specifically includes a priority target on achieving a land degradation neutral world by 2030. (UNCCD,2013)

The strategy behind land degradation neutrality is the integration of the three activities prescribed by the UNCCD the “prevention and/or reduction of land degradation”, the “rehabilitation of partly degraded land,” and the “reclamation of desertified land.”

A SDG for a land-degradation neutral world would require the appropriate enabling environment to ensure coherent and coordinated progress towards its achievement, including a target-setting approach within an

institutional framework that would provide the necessary policy and scientific guidance including practical assessment and monitoring tools. (UNCCD, 2013)

Payment for Ecosystems Services (PES)

The concept of PES includes a variety of arrangements through which the beneficiaries of ecosystem services pay those providing the services. PES services can be defined on market based definitions, with direct transactions between providers and beneficiaries (including schemes where private buyers and sellers arrange voluntary and conditional transactions for the delivery of ecosystem services), or as broader schemes in which those who benefit from the ecosystem services pay (usually indirectly) those who provide the services. (GEF, 2014)

In this regard, the GEF pioneered the funding of mechanisms that reward good stewardship of natural resources, by promoting the concept and application of PES schemes focusing on the arrangements between buyers and sellers of environmental goods and services in which those that pay are fully aware of what it is that they are paying for, and those that sell are proactively and deliberately engaging in resource use practices designed to secure the provision of the services.

GEF supported 57 projects where PES is central to the project's design, 15 projects where PES is part of the project design but not a core element and another 28 projects where PES is only a minor element leveraged an additional \$395 million in co-financing. (GEF, 2014)

Of the projects that have PES as the core, component or element, 32 are in the Biodiversity Focal Area, 11 are Sustainable Forest Management, 10 are Multi-focal Area projects (including Biodiversity), and 4 are in land degradation. (GEF, 2014)

The GEF portfolio of PES projects is concentrated in Latin America and the Caribbean (32 projects), followed by Africa (10 projects) and Asia (8 projects). There are also four global projects and three in Europe; one regional (Bulgaria and Romania) and two country based (Albania and Croatia).

PES in Land Degradation (LD)

The GEF has four PES projects in the Land Degradation Focal Area, and six of the 10 Multi-focal Area projects include Land Degradation:

- **Agricultural Productivity and Sustainable Land Management (Kenya):** The project's objective is to reduce sedimentation in the project area. GEF is investing \$10 million and leveraging an additional \$72 million in co-financing for this project.
- **Ecosystem Restoration of Riparian Forests in (São Paulo Brazil):** The project is developing a comprehensive policy and regulatory framework to support the creation of funding mechanisms. GEF is investing \$7.0 million and leveraging \$11.8 million.
- **Demonstrating Sustainable Land Management in the Upper Sabana Yegua Watershed System (Dominican Republic):** Payments are made in cash and in kind for the maintenance of forested areas, to guarantee the availability of timber and other building material. GEF is investing \$4.4 million and leveraging \$25.4 million.
- **Sustainable Land Management in the Semi-arid Sertao (Brazil/ Latin America):** The project supports the establishment of an incentive program for land-use practices that generate environmental services. GEF is investing \$5.9 million and \$9.2 million in co-financing.

Biodiversity offsets

Biodiversity offsets are measurable conservation outcomes from actions designed to compensate for significant residual adverse biodiversity impacts due to project development after appropriate prevention and mitigation measures have been taken. (OECD, 2014)

The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity. They are intended to be carried out as the final step of the mitigation hierarchy; avoid, minimise, restore and offset, to help meet a scheme's environmental objectives. (OECD, 2014)

First used in the United States in the 1970s to mitigate damage to wetlands, there are at least 56 countries that have laws or policies specifically requiring biodiversity offsets or another form of compensation for particular impacts as of 2014. About 97 biodiversity offset programs are currently operating worldwide, with another 15 in various stages of development. (OECD, 2014)

There are three types of off-sets:

One-off offsets: once (predicted) adverse impacts have been evaluated, it is the developer's responsibility to carry out the biodiversity offset, assuming financial and legal liability. Verification is normally undertaken by a government agency or an accredited third party. One-off approaches are typically used in voluntary offsets and are common under regulatory programmes (e.g., vegetation management offsets in Queensland, Australia and

Species Mitigation and Wetland Compensatory Mitigation in the United States)

In-lieu fees: a government agency stipulates a fee that a developer has to pay to a third party, to compensate for residual adverse biodiversity impacts, taking financial and legal responsibility for the offsets. In-lieu fees have been used in the US Species Mitigation and Wetland Compensatory Mitigation, and in forest compensation schemes in India and Mexico.

Biobanking: once (predicted) adverse impacts are evaluated, the developer can purchase offsets directly from a public or private biobank, which is a repository of existing offset credits, where each credit represents a quantified gain in biodiversity resulting from actions to restore, establish, enhance and/or preserve biodiversity. The developer transfers responsibility to the provider. Examples include the New South Wales Biobanking scheme in Australia, and compensation pools under the German Impact mitigation Regulation (OECD, 2013)

Below is a sample of projects:

Entity	Programme	Objective
African Development Bank	ADB Operational Safeguard 3	To deliver a net benefit or no net loss for residual biodiversity impacts on natural habitats
Alberta, Canada	Wetland Policy	To sustain the benefits wetlands provide to the environment, society and the economy
Asian Development Bank	AsDB Policy Principles and Requirement 8	To deliver at least a no net loss for residual biodiversity impacts on natural habitats and critical habitats
China	Forest Vegetation Restoration Fee	To restore a forest area no less than that taken up by the developer's operations
France	National doctrine on the mitigation hierarchy, and national guidelines on the mitigation hierarchy	No net loss, and ideally, net gain of natural habitats
Germany	Impact Mitigation Regulation	Preservation of the existing ecological situation
International Finance Corporation	IFC Performance Standard 6	To deliver no net loss for residual biodiversity impacts on natural habitats and net gains for critical habitats

The Green Climate Fund

The Green Climate Fund (GCF) is a fund within the framework of the UNFCCC founded as a mechanism for developed countries to assist the developing countries in adaptation and mitigation practices and shift towards a low- emission, climate resilient development pathway to counter climate change. The fund was proposed in 2009, approved in 2010 and is fully operational, without a set expiry date.

The GCF will support projects, programmes, policies and other activities in all developing country parties to the UNFCCC, finance activities to both enable and support adaptation, mitigation, technology development and transfer, capacity-building and the preparation of national reports. Countries will also be supported in pursuing project-based and programmatic approaches in accordance with strategies and plans (such as low-emission development strategies and NAMAs.)

The GCF will also provide some readiness support to help countries and institutions effectively access and use the Fund's resources.

There was strong global support for the GCF, with several world leaders calling for the Fund's initial capitalization at an amount no less than \$10 billion. As of December 2014, the total pledged from 27 countries is close to USD 10.2 billion. (GCF, 2014)

The Fund is designed to work through partners, including national institutions like national development banks and international institutions like the World Bank. Private sector involvement is central to the Fund, which will use innovative financial instruments to encourage private companies to invest in climate change, and to stretch the Fund's resources.

Ecological infrastructure and resilience

Ecological infrastructure refers to functioning ecosystems that deliver valuable services to people, including healthy mountain catchments, rivers, wetlands, coastal dunes, and nodes and corridors of natural habitat, which form a network of interconnected structural elements in the landscape. It is a public good that is largely free; its value is rarely captured in the market transactions, leading to a tendency to under-invest in it. (SANBI, 2012)

Strategic investment in ecological infrastructure saves money by lengthening the life of existing built infrastructure and reducing the need for additional built infrastructure. For example, degraded ecological infrastructure leads to reduced capacity and lifespan of dams and increases the risk of flooding and therefore damage on built infrastructure.

Investing in ecological infrastructure can improve rural livelihoods and quality of life through direct job creation and the strengthening of sectors such as ecotourism and farming, since key elements such as

catchments and natural vegetation are found in rural areas.

Well managed ecological infrastructure can play a crucial role in reducing disaster risk due to extreme events that are likely with climate change; for example, coastal ecosystems such as dunes, mangroves and kelp beds reduce the impact of storm surges on coastal settlements.

The following seven principles should guide investment in ecological infrastructure:

- It should focus on systematically identified spatially strategic areas
- It should be strengthened by a transdisciplinary approach
- It should build on and learn from existing experience and programmes
- It should optimise its contribution to job creation, poverty alleviation and rural development It should take place in a participatory and socially sensitive manner
- It should include monitoring and evaluation

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