



The Biodiversity Advantage

Thriving with nature: biodiversity for sustainable livelihoods and food systems

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livelihoods and food systems**

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Introduction

The resources around us, which keep us alive, with air in our lungs, water to drink and food to eat, all fundamentally rely on biodiversity. Biodiversity is of the utmost importance to our continued survival; without it, the earth would cease to be habitable for humans. The interdependence of humans' daily lives and well-being, the economy and nature was highlighted in the recent Dasgupta Review (2021), which concluded that we have to reorient ourselves around the understanding that the economy is embedded in nature and is reliant on its sustainable management as an asset (Dasgupta, 2021). According to the UN Convention on Biological Diversity, at least 40 per cent of the world's entire economy derives from biological resources, and 80 per cent of the global poor's needs are derived from biological resources. Biodiversity is essential for the integrity of natural ecosystems, which provide a wealth of services that would otherwise be inaccessible to communities all over the world. It has been calculated that nature provides US\$24 trillion of non-monetized benefits to humans each year (IPBES, 2018).

However, biodiversity on earth is currently in an incredibly precarious position. The recent publication by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which builds on the 2005 Millennium Ecosystem Report, paints a grim picture of the current predicament and of the future if no intervention is taken. It finds that around 1 million animal and plant species are threatened by extinction, many within a few decades.

The average abundance of native species in most major land-based habitats has fallen by at least 20 per cent, mostly since 1900. More than 40 per cent of amphibian species, almost 33 per cent of reef-forming corals and more than one third of all marine mammals are threatened.¹ One third of global marine fisheries are currently overfished, with negative consequences for biodiversity and ecosystem functioning, and jeopardizing the long-term social and economic benefits of these resources (FAO, 2020). Countries report that many species that contribute to vital ecosystem services, including pollinators, the natural enemies of pests, soil organisms and wild food species, are in decline as a consequence of the destruction and degradation of habitats, overexploitation, pollution and other threats (FAO, 2019). We have severely altered 75 per cent of all terrestrial habitats on earth, and the accumulated weight of human-built structures outweighs the biological mass of all animals on earth as of the end of 2020 (Elhacham et al., 2020).

Biodiversity definition

In this report, when we speak about biodiversity, we use the definition given by The Convention on Biological Diversity: “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystem”.

The international community has attempted to meet the challenges facing biodiversity with a multilateral treaty known as the Convention on Biological Diversity (CBD). The CBD sets out three overarching goals: to conserve biodiversity; to utilize biodiversity resources sustainably; and to share fairly any benefits that arise from genetic resources. The United Nations declared 2011 to 2020 as the United Nations Decade on Biodiversity in December 2010, and in support created a *Strategic Plan for Biodiversity 2011-2020*, a key part of which were the Aichi Biodiversity Targets. These 20 ambitious targets, to be achieved by 2020, addressed the key effects and causes of biodiversity loss across the world. *Global Biodiversity Outlook 5*, published in 2020, looks at the progress that has been made towards achieving these goals. At the global level none of the 20 targets have been fully achieved, though six targets have been partially achieved (Secretariat of the Convention on Biological Diversity, 2020). The IPBES report similarly found that global goals for preserving biodiversity will not be met if progress continues to follow its current trajectory, and that negative trends in biodiversity and ecosystems will undermine progress towards 35 out of 44 of the assessed targets of the Sustainable Development Goals (SDGs).

In charting a path forward, *Global Biodiversity Outlook 5* identifies a number of actions that are critical for arresting the increasing loss of biodiversity. Among the suggested actions, it clearly states that transformations need to be achieved in the production of goods and services, especially food. This will include adopting

1. WWF, IPBES 2019 Report, <https://ip.panda.org/ipbes>.

agricultural methods that can meet growing global demand while imposing fewer negative impacts on the environment and reducing the pressure to convert more land for production. Transformations are similarly needed to limit the demand for increased food production, by adopting healthier diets and reducing food waste, and also to limit the consumption of other material goods and services affecting biodiversity, for example forestry products, energy and fresh water. The Fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity, planned for the latter part of 2021, is set to “adopt a post-2020 global biodiversity framework as a stepping stone towards the 2050 Vision of ‘Living in harmony with nature’”. It is likely that the goals of the CBD will attempt to integrate the lessons learned from the failure to achieve the Aichi targets, and that changing our food systems will play a pivotal role in the achievement of these goals.

The IPBES report indicates that the loss of biodiversity is not just an environmental issue, but one that intersects with developmental, economic, social, security, and moral aspects as well. The report suggests that only through transformative changes across economic, social, political and technological factors, is there the possibility of improving the current trajectory of biodiversity loss. IFAD recognizes this, and also recognizes that losing biodiversity means losing opportunities for coping with future challenges, such as climate change and food insecurity. The interventions undertaken at IFAD take into account many aspects of environmental degradation, and the causal relationships behind it, in order to pinpoint areas where action has the most potential for improvement, in communities that often will suffer the most from the effects of continued biodiversity loss. Further detail of the strategies undertaken by IFAD are found in box 1, as well as in the case studies section of this document.

Let's remember: there can be no separating climate action from the larger planetary picture. Everything is interlinked – the global commons and global well-being. That means we must act more broadly, more holistically, across many fronts, to secure the health of our planet on which all life depends. Nature feeds us, clothes us, quenches our thirst, generates our oxygen, shapes our culture and our faiths, and forges our very identity.

United Nations Secretary-General António Guterres 2020 Lecture “State of the Planet”

Why is biodiversity important to small-scale agriculture and food systems?

The Millennium Ecosystem Assessment in 2005 was the first global effort to examine links between human well-being and biodiversity. The assessment found benefits to societies from biodiversity in material welfare, security of communities, resilience of local economies, relations among groups in communities and human health. Since then, the IPBES’s 2019 Global Assessment Report on Biodiversity and Ecosystem Services has gone even further, indicating that there is a critical need to integrate biodiversity considerations into global decision-making in any sector or challenge, whether that be water, agriculture, infrastructure or business.

Many smallholders already know that the sustainable management of biodiversity is the cornerstone of long-term agriculture. It underpins the productivity, resilience and, ultimately, the security of all food systems.

Biodiversity supports food production through soil formation and land productivity, pest and disease control, and pollination services. Studies have linked genetic diversity with improved yields in commercial crops (Cardinale et al., 2012). In plantation forests, tree species diversity is positively linked to wood production and, in grasslands, biological diversity is associated with higher levels of fodder production and could potentially provide substitutes for costly agricultural inputs, such as fertilizers, pesticides, imported pollinators and irrigation (Isbell et al., 2017; Narain et al., 2008). The benefits of biodiversity are not, however, confined to food and natural resources. Water sources in catchment areas that include intact natural forests, wetlands or peatlands are almost always of higher quality than in those in other catchment areas, with less sediment and fewer pollutants. Biological features such as mangrove forests or coral reefs provide barriers against storm surges, and these naturally regulating services can reduce the risk of disasters (Ash et al., 2007; Reyers et al., 2015), in addition to their essential role as habitat, breeding points and nurseries for aquatic wildlife. Inhabitants of rural areas, as well as pharmaceutical companies, have reaped the benefits of medicinal plants, which are largely found in highly biodiverse systems.

Rural people in poverty are specifically at risk when biodiversity is compromised or environmental degradation occurs. They often depend on a great range of natural resources and ecosystem services for their well-being, and they often have multiple streams of income which rely on natural resources in their area. While richer groups of people may be able to offset local losses of ecosystem services by moving to another area or buying substitute inputs, poor people in rural areas often lack these alternative opportunities, and a loss of biodiversity can translate into a significant loss of livelihood. Similarly, diversified sources of nutrition can result in an improved diet for vulnerable people who cannot afford to buy nutritious food or in areas where nutritious food may not be available for purchase. There is evidence from both cultivated and wild settings that nutrition is better, and dietary diversity greater, in household production units with higher crop and animal diversity, and that this is true of both subsistence and income-generating pathways (Jones, 2017).

The strategic management of locally available biological diversity (cultivated or wild) is therefore key in supporting ecological functions and maintaining food cultures, as well as providing nutritious diets based on diversification, which are particularly relevant for the most vulnerable, who cannot afford to buy nutritious food. While the linkages between poverty reduction and conservation trajectories are often very complex and case specific, a growing body of knowledge recognizes the importance of anchoring project designs in local food cultures and household objectives, and of integrating scientific and local farmer knowledge in the co-design of more sustainable farming systems.

Box 1: Social, Environmental and Climate Change Assessment Procedures

IFAD believes that social, environmental and climate sustainability is a fundamental aspect of achieving outcomes consistent with its mandate, and places the highest priority on projects and programmes that foster social, environmental and climate sustainability.

To meet this goal, in 2020 IFAD updated its Social, Environmental and Climate Change Assessment Procedures, which apply to all its investments. These procedures strengthen IFAD's relationship with countries, rural communities and the private-sector companies that it aims to collaborate with, as well as with stakeholders in development processes and the broader development cooperation and donor community. All projects supported by IFAD or cofinanced with IFAD are required to comply with these procedures.

If biodiversity conservation is determined to be applicable to a project, the potential impacts of the project on biodiversity, ecosystems and ecosystem services need to be examined as an integral part of assessing the project's full range of potential adverse social and environmental impacts. If a project is deemed to present significant risks to biodiversity or likely to have adverse impacts on biodiversity, the grant recipient/borrower is required to develop and implement a biodiversity management plan, which involves gathering baseline data on the relevant biodiversity attributes and ecosystem services, as well as monitoring biodiversity data as project implementation progresses. It is equally important to pay attention to the different ways in which different cultures perceive biodiversity in their area. As a part of the assessment process, the project will establish a core set of "biodiversity values" that different stakeholders – in particular, project-affected communities – attach to particular attributes of potentially affected biodiversity and ecosystem services. Vulnerability and irreplaceability of biodiversity and ecosystem features will be important aspects to consider in the assessment of project impacts and risks.

IFAD-supported projects will take a precautionary approach to avoid risks to biodiversity where possible, and use a mitigation hierarchy (in order of priority, avoid, minimize, mitigate and offset/compensate) to ensure no net loss for biodiversity values across a region. There are also strict measures governing project activity in areas of critical habitat, with the aim of preserving existing biological corridors and habitat connectivity. Long-term biodiversity action plans must be drawn up and should seek to foster net gains in the biodiversity values that led to the designation of the area as a critical habitat.

Long-term monitoring will be a feature of the action plans, and will include tracking both social and environmental management measures through the financing cycle. The extent of monitoring will be proportionate to the nature of the project; however, as a guiding principle stakeholders and third parties, such as independent experts, local communities or NGOs, should complement or verify monitoring activities.

IFAD and biodiversity

The situation for biodiversity is certainly now more urgent than ever. The failure to make significant progress towards the Aichi Biodiversity Targets by 2020 shows that action in cooperation with governments, with a shared understanding of the scale of the challenges faced by the natural world, is absolutely critical. Since biodiversity is usually not a primary aim of IFAD's projects, but often a positive by-product, it is not always captured well in the reporting. While environment and natural resource management is often mentioned and measured, explicit metrics of species counts, species diversity or biomass of living things in an ecosystem or area are usually beyond the scope of the project monitoring. Therefore, IFAD recently conducted a stocktake of recent projects to better assess the extent to which they are relevant to biodiversity. Out of 66 projects surveyed that had completion dates in 2020 and 2021, one third had a component related to biodiversity, and 4 out of 10 had at least some activities linked to biodiversity.

Recognizing that biodiversity is an integral part of agriculture and other food-producing systems, such as fisheries and aquaculture, IFAD is committed to supporting governments and working with other key actors to prioritize biodiversity as a vital element of these systems. There are significant correlations and connections between biodiversity and other high-priority areas of IFAD investments such as climate change, gender empowerment and gender equity, nutrition and youth. These connections are explored in box 2.

Box 2: Intersections between biodiversity and other issues

Biodiversity and climate change

Sustainable community management of natural resources and farming systems, diversification and practices conserving habitats are the principal biodiversity-related activities linked to climate change. All of these activities are used as adaptation strategies as they improve the health of ecosystems and ecosystems services, increasing their resilience to climate change impacts and decreasing the vulnerability of local communities that depend on natural resources for their livelihoods. In addition, afforestation, reforestation and soil conservation practices boost soil carbon sequestration, thus contributing to the mitigation of climate change.

Biodiversity and gender

Links between gender and biodiversity are principally to be found in the diversification of production, market access, farming systems and practices that conserve habitats, and community natural resource management. The promotion of diverse activities such as livestock raising, backyard market gardening, bee-keeping, fruit production and handicrafts using locally available resources, as well as their added value through processing and marketing, is an important strategy to empower women to play a more visible and leading role in household income generation. Indigenous women often already have the knowledge required to sustainably manage natural resources and conserve agrobiodiversity, and IFAD endeavours to make use of that knowledge where possible to inform project actions.

Box 2: Intersections between biodiversity and other issues

In developing countries, women most often dominate post-harvest activities related to fish processing, seaweed farming and aquaculture, all of which highly depend on healthy aquatic ecosystems. Their significant involvement in agricultural production means that their participation in activities promoting sustainable, pro-biodiversity practices is widely encouraged across IFAD projects. Community natural resource management is often used as an opportunity to involve women in decision-making processes and encourage them to take on leadership roles in related organizations. Furthermore, ecosystem restoration activities such as the development of tree nurseries and planting provide jobs for both women and youth.

Biodiversity and indigenous peoples

The use of traditional knowledge in farming and fishing systems and practices that conserve habitats, sustainable use and in situ conservation, in addition to local seed and animal breeding systems, are the main biodiversity activities mentioned in relation to indigenous peoples in IFAD project documents. Many of these projects recognize the important role of traditional knowledge in the development or enhancement of sustainable food systems, such as indigenous fishing communities across the world using sustainable fishing practices based on their knowledge of fish life cycle patterns, traditional rules and conservation methods such as non-fishing seasons and exclusion zones. Traditional agricultural systems also incorporate significant adaptive capacity in the face of climate change thanks to their diversified, low-input nature and their conservation and use of locally adapted traditional species and natural resources.

Biodiversity and nutrition

Nutrition is mainly linked to biodiversity through the diversification of production, sustainable use and in situ conservation, as well as the minimization or elimination of the use of agrochemicals. The diversification of farming systems, for example by integrating crops and livestock or aquaculture, or the development of market gardens that include both vegetables and fruit trees, is promoted in many projects, with the aim of improving food security and nutritional intake of both producers and consumers, as it increases the availability of nutritious food and enhances smallholder incomes. Some projects specifically promote the production of particularly nutritious local animal and crop varieties to improve nutrition security, which has the co-benefit of simultaneously contributing to sustainable use and in situ conservation. An important focus in IFAD's investments in fisheries has been to widen the range of aquatic foods, with some projects looking at ways of culturing the nutrient-dense species that are currently underutilized for food, including small fish, crustaceans, algae (e.g. spirulina) and seaweed, and to take an ecosystems approach to fisheries management. This is an integrated approach that helps to protect vulnerable fisheries through specific policy and regulatory actions as well as by improving the wider ecosystem for their survival. Sustainable agricultural production that reduces the use of agrochemicals is linked to nutrition as it contributes to increased food safety and has positive health impacts.

Box 2: Intersections between biodiversity and other issues

Biodiversity and youth

The link between youth and biodiversity is made mainly in terms of market access, as well as educational activities, including education on environmental protection through natural resources management and sustainable agricultural activities. Owing to limited access to land and employment opportunities in rural areas, many of the projects analysed provide vocational training or other capacity-building activities that promote young people's management, organizational and entrepreneurial skills in areas such as processing, value addition and commercialization. Youth are also agents for change regarding the management of natural resources increasing biodiversity; in a number of IFAD projects youth groups have trained local communities to sustainably manage and conserve natural resources. This links to biodiversity because the practices adopted are aimed at avoiding pollution and improving waste management, as well as using renewable energy technologies.

This link reaffirms the fact that solutions that target the biodiversity crisis must look holistically at the human and societal systems, as there are connections everywhere.

Case studies

What follows is a selection of currently active IFAD projects that have been identified as relating to biodiversity. They are from across the world, and the problems that each of them deals with are as unique as the people and landscapes they feature. They show the variety of ways in which people interact with their landscape, and the need for careful design to ensure that projects are culturally specific and address local concerns. Some commonalities between the different projects will be discussed in the conclusion.



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Kenya: Upper Tana Catchment Natural Resources Management Project

Key facts

Project name	Upper Tana Catchment Natural Resources Management Project
Dates	2012-2022
Target group	300,000 rural poor households
Financing	IFAD, including the Adaptation for Smallholder Agriculture Programme; the Kenyan Government; local beneficiaries; and the Spanish Trust Fund

Development challenges

Kenya is a low- to middle-income country and has registered robust economic growth over the last five years, with an average GDP growth of 5.5 per cent, however, the country's poverty levels are still high. Despite a decline from 46.8 per cent in (2005/06) the number of Kenyans living on less than US\$1.90 per day still comprised 36.1 per cent of the population in 2015/16. The coronavirus disease 2019 (COVID-19) pandemic has pushed more Kenyans into poverty, and it is expected that the national poverty levels will increase. Poverty is more widespread in rural than urban areas (40.1 per cent and 29.4 per cent, respectively) and disproportionately affects women and youth. An estimated 25 per cent of children under 5 years are stunted, and 17 million Kenyans suffer from chronic food insecurity and poor nutrition.

Project area



High levels of rural poverty persist because of the high population growth rate, small landholdings, frequent droughts, large rural income disparities, and strong linkages between poverty and environmental degradation, particularly poor water management, soil erosion and declining fertility. Together with the impact of HIV/AIDS, these factors have eroded development gains in Kenya in natural resource management (NRM), education, health, food security, employment and income. In the Tana catchment area, conflict with wildlife poses a further challenge to small-scale farmers, with herds of elephants having the ability to destroy entire crops.

The Tana catchment is the most important basin in Kenya, covering 95,950 km² (approximately 17 per cent of Kenya's land mass). Its flow constitutes 27 per cent of the total mean discharge of the country's rivers. The associated Mount Kenya and Aberdares Forest ecosystems represent two of Kenya's critical "water towers", intercepting clouds and capturing most of the rains that feed the Tana river system. They constitute 25 per cent of the gazetted forest areas in Kenya and are home to much of Kenya's iconic wildlife, including endangered species such as the mountain bongo antelope (*Tragelaphus eurycerus isaaci*).

The **project area** is the Upper Tana catchment, which covers an area of 17,420 km² and includes 24 river basins and the tributaries of the four rivers formerly under the Mount Kenya East Pilot Programme for Natural Resources Management (MKEPP-NRM) that drain into the Tana River. The area covers six counties, Embu, Kirinyaga, Meru, Murang'a, Nyeri and Tharaka Nithi, and associated hotspots and protected areas. The Upper Tana catchment has experienced considerable land degradation and a drastic reduction in surface water availability, especially during the dry season. The current levels of river discharge leave very little scope for further development of surface water resources for irrigation.

Forest degradation, inappropriate farmland use practices and overgrazing in the pastoral lowlands have triggered increased soil erosion, leading to a high sediment load in the Tana river, which has contributed to the rapid loss of the life-supporting functions of the river and catchment ecosystem, impacting heavily on local biodiversity and contributing to the persistently high levels of poverty.

The high sediment load has serious consequences on hydropower generation, the supply of water to Nairobi and the availability of water for irrigation for agricultural production (crops, livestock, fisheries) and for domestic purposes in the largely semi-arid counties around the river.

Project responses

The Upper Tana Catchment Natural Resource Management Project (UTaNRMP) empowers local communities to sustainably manage natural resources for provision of environmental services and to increase sustainable food production and incomes for poor rural households. The anticipated benefits include reduced silt load in the rivers that discharge into the hydropower-generating dams; increased availability of water, which reduces water use conflicts; improved biodiversity in the Mount Kenya and Aberdares Forest ecosystems, which leads to increased tourism revenues; and improved adaptive capacity and resilience to environmental change. The global benefits of the project include the maintenance of the status of Mount Kenya National Park and Forest Reserve as a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (since 1997), as a Man and Biosphere Reserve (since 1978) and as an International Bird Area.

Community-based participatory approaches in project implementation, community engagement and institutional collaboration have greatly enhanced community ownership and progress towards the success of the project. For example, community action plans (CAPs) were jointly developed between beneficiary communities and government officers, promoting partnership, project ownership and sustainability.

The project assesses the interests and needs of communities and uses them as an entry point to sustainable natural resource management across the catchments. Implementation experience has shown that communities are more responsive to NRM activities that have a bearing on income generation and improvement of livelihoods. UTaNRMP provides matching grants to communities that apply for funding for their microprojects with reference to their CAPs and sub-catchment management plans (SCMPs).

The ecosystem approach implemented through SCMPs and the Plantation Establishment and the Livelihoods Improvement Scheme (PELIS) promoted through the Forest Act, 2005, have proven to be effective approaches in managing natural resources and building ecosystem resilience. Through the use of SCMPs and PELIS, the ecosystem is taken as a conservation unit, irrespective of administrative boundaries, which results in enhanced environmental benefits to biodiversity and the ecosystem itself. In UTaNRMP, the Mount Kenya and Aberdares Forest ecosystems are considered single management units in terms of efficiency and enhanced ecosystem products and benefits. Environmental hotspots, including wetlands, hilltops and riverbanks, are targeted for rehabilitation and conserved jointly for maximum impact and benefit.

Communities in neighbouring forests form community forest associations and are legally allowed to participate in forest management, using participatory forest management plans (PFMPs) and forest management agreements, with clear roles and responsibilities. The result is improved forest management and conservation,

greater ownership of sustainable forest management activities and better working relationships between communities and government agencies for the benefit of the environment.

The sustainable management of water at the community and catchment levels is critical, especially for a water-scarce country such as Kenya. The communities along river basins are legally allowed to participate in sustainable water resource management through water resource users' associations, using SCMPs, with clearly defined roles and responsibilities for the users, thereby minimizing water use conflicts and improving water use efficiency.

Biodiversity and environmental impacts

Rehabilitation of degraded forests

The project has rehabilitated 2,413 hectares of degraded forestland in the Mount Kenya and Aberdares Forest ecosystems, which is critical to conserving the ecosystem function of capturing the rain and moisture that feed the river system that serves the communities, while also sequestering carbon and helping to conserve other non-timber forest products. In addition, with UTaNRMP support, 12 new PFMPs have been developed and 27 existing PFMPs have been reviewed. A further 31 community forest associations have received funding to support the implementation of PFMPs in the 10 km buffer zone around the Mount Kenya and Aberdares Forest ecosystems through matching grants administered by the Water Services Trust Fund, a Government of Kenya parastatal agency.

Other tree-planting activities

Tree-planting activities promote water and soil conservation on farmlands and other degraded areas. The project established seedling nurseries in target communities, with 100 seedlings being planted on 7,450 farms (with an average survival rate of 77 per cent). Seedlings were also provided to more than 2,439 schools as part of the **School Greening Programme** (150-500 per school). This programme introduces environmental management approaches to schools and students, with each pupil "adopting" a tree. The schools also act as learning and demonstration sites, introducing neighbouring communities to tree planting and species selection. This approach of pupils attending to and caring for their individual trees exhibits high seedling survival rates, but also instils in pupils a culture of environmental governance and provides a learning resource for neighbouring communities. The School Greening Programme has also resulted in schoolchildren planting trees at their homes and a few small, home, "satellite" tree nurseries.

Natural resource management

The project has made great strides in the promotion of a range of energy-saving stoves and biogas initiatives at both household and institutional levels. Some of the institutions have kept records of the savings being realized both financially and in terms of a reduction in wood use, which is typically of the order of 50 to 60 per cent, and in charcoal use.

Rehabilitation of springs and the provision of secure water supplies to the communities is one of the great successes of the project, ensuring that water is available for household use and agricultural activities. To date, 95 springs, 81 boreholes, 41 shallow wells, 32 domestic water supplies and 17 environmental hotspots have been rehabilitated or installed, and it is now necessary to assess the social and economic impacts of this intervention. The UTaNRMP has also, as part of its sustainability mechanism, set up the complementary Upper Tana Nairobi Water Fund,² a public-private partnership that invests in measures to reverse land degradation in catchment areas and promote on-farm conservation practices. The fund enhances upstream and downstream linkages among the national government, county governments, private-sector organizations and farmers (see box 3).

Box 3: The Upper Tana Nairobi Water Fund (UTNWF)

The UTNWF was established as a first-of-its-kind water fund in Africa, with aims complementary to those of the UTaNRMP. UTNWF works with public- and private-sector partners, such as the Global Environment Facility (GEF), providing a sustainable financing mechanism to support integrated natural resource management approaches in the Upper Tana catchment. UTNWF aims to:

- bring about a well-conserved Upper Tana river basin for improved water quality and quantity for downstream users, maintaining regular flows of water throughout the year, protecting remaining aquatic and terrestrial biodiversity and enhancing ecosystem services by maintaining regular flows of water, supporting at least 21,000 smallholder households (around 100,000 individuals)
- adopt climate-smart, sustainable land management practices in the Upper Tana catchment, with the aims of increasing food security and climate adaptation potential at household level, stabilizing and restoring ecosystem services and improving water quality and quantity for upstream and downstream water users.

Through Resilient Food Systems, IFAD and GEF seek to position the management of natural capital as a priority in ongoing efforts to transform the agricultural sector and ensure sustainable food production in sub-Saharan Africa. Implementation is led by IFAD, in collaboration with 12 African countries and several regional partners.

2. More information on the project is available here: <https://www.thegef.org/sites/default/files/events/UTNWF%20GEF%20-%20ECW%20Conference%20Feb%202020%20Briefing%20Presentation%20-%20Anthony.pdf>

Wildlife fencing

The project constructed a 60 km solar-powered wildlife control fence in the Mount Kenya forest ecosystem in two years (instead of the planned six years) through a public-private partnership between the project, the Kenya Wildlife Service, Kenya Forest Service, the Rhino Ark Foundation, the Mount Kenya Trust and beneficiary communities. Since the fence was built, the annual number of human-wildlife conflict cases in the affected areas has fallen from 117 to 3, a reduction of 97 per cent, while loss of human life has fallen by 100 per cent.

As a result of various other initiatives, including the former MKEPP-NRM, a further 190 km (of the estimated target of 450 km) of wildlife control fence has been constructed in the Mount Kenya ecosystem, although the design and standard vary. The fencing has greatly reduced the cost to government agencies of responding to human-wildlife conflicts and has reduced incidents of illegal logging and poaching. The Government of Kenya has requested additional financing to construct a further 60 km of the improved solar-powered fence (at 30 km a year), maintaining the existing management agreement between UTA-NRMP, the Rhino Ark Foundation, the Mount Kenya Trust, the Kenya Wildlife Service and the Kenya Forest Service.

The wildlife fence has led to improved food and nutrition security by enabling crop diversification and the production of high-value horticulture crops. The value of land close to the fence has appreciated by 86 per cent, and ecosystem health has improved through a reduction in illegal activities, while the working relationship between the government agencies (mainly the Kenya Forest Service and Kenya Wildlife Service) and communities has fostered a successful partnership for the overall benefit of the ecosystem.

Socio-economic impacts

Improved water and natural resource management and conservation efforts have led to improved water quality and quantity in the targeted river basins and access to clean domestic water, as well as improved livelihoods and incomes due to the development of community water resources. So far, 2,515 hectares is under small-scale irrigation, with 12,575 households irrigating and each household earning, on average, Ksh8,200 (US\$82) per month over and above ensuring food security at the household level. As a result of the promotion of energy-saving cook stoves and biogas, farmers, common interest groups and institutions are reporting a 50-60 per cent reduction in fuelwood costs and time spent cooking and collecting firewood. The solar-powered wildlife control fence has reduced human-wildlife conflicts, resulting in positive benefits such as increased incomes and better livelihoods for farming communities close to the fence. Promotion of institutional biogas plants in schools has led to the reduction of pollution of water bodies through sewage discharge from institutions such as schools.

Conservation agriculture

The project has supported various groups with interventions to enhance productivity of both livestock and crops. Conservation agricultural practices, improved livestock breeds and improved feed for livestock have contributed to increasing productivity. For example, a technology using tissue culture for banana propagation has increased the yield of bananas threefold and reduced the maturity period by half. A recently conducted rapid impact assessment found that enhanced adoption of improved dairy cattle and goat breeds among farmers has resulted in a doubling of average daily milk production in cattle, while goat milk production was found to have quadrupled. Egg production has also doubled per year as a result of the adoption of improved poultry breeds. These technologies have been adopted by 81 per cent of farmer field school members, and many have further trained other, non-participating, farmers.

Farmers reported during the field visits that conservation agriculture practices have enhanced the productivity of the labour and land, with an associated reduction in cost, which has enabled vulnerable farmers, including those with disabilities, to farm without resorting to hired labour. Also, the beneficiary farmers have been able to support non-beneficiary farmers in their communities to adopt the conservation agricultural practices because of increased productivity.



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Brazil: Rural Sustainable Development Project in the Semi-arid Region of Bahia

Key facts

Project name	Rural Sustainable Development Project in the Semi-arid Region of Bahia
Timespan	2014-2022
Target group	Poor or extremely poor smallholder family farmers, especially women and youth, and traditional communities such as <i>quilombola</i> (Afro-Brazilians) and <i>fundo de pasto</i> (collective areas) communities
Financing	IFAD, the Government of Brazil and beneficiaries, total project financing US\$105.81 million

Development challenges

Although Brazil has been able to lift a significant proportion of its population out of poverty through its remarkable economic growth over the past few decades, the economic slowdown in recent years has contributed to inequality remaining high in rural areas, particularly in the northern and north-eastern parts of Brazil, which are the poorest areas of the country. This is reflected in the emergence of a dualistic agricultural system characterized by, on the one hand, large-scale export commodity farming and, on the other, small-scale family farming.

Project area



Although family farms account for 84.4 per cent of production units, they occupy only 24.3 per cent of the area farmed. Traditional ethnic minority communities, such as the *quilombolas*, indigenous groups and *fundo de pasto*, that adopt traditional systems of collective farming face particular challenges, including those relating to land tenure, marketing, organization and access to technical assistance services. In addition to the unequal distribution of land, difficulties in accessing markets, the weak organizational basis of farmers' associations, climate change, the dependence on social programmes such as cash transfer and the patriarchal nature of society, resulting in the exclusion of women and youth in decision-making, are the principal barriers to increasing incomes and enhancing livelihoods of poor rural farming populations.

The recent developments in the agricultural sector have also contributed to substantial land use change and associated biodiversity loss. The north-eastern region in Brazil is home to the unique and fragile Caatinga biome, characterized as semi-arid, spanning 850,000 km² and comprising thousands of endemic plant, fish, reptile, amphibian, bird and mammal species (Santos et al., 2011). However, extreme poverty and a dependence on natural resources for livelihoods are leading to the overexploitation of natural resources. In particular, overgrazing and logging for fuelwood have resulted in the degradation and deforestation of the Caatinga biome. In this area of the country, climate change, resulting in prolonged droughts, is further exacerbating these trends, leading to water scarcity, desertification and important losses of crop and livestock. The consequent lack of opportunities has resulted in an increase in migration for seasonal work and in permanent rural-urban migration, mainly among the youth population.

Project responses

The Rural Sustainable Development Project in the Semi-arid Region of Bahia or Pro-semi-arid Project (PSA) empowers vulnerable rural populations in the semi-arid area of the State of Bahia to live in harmony with their environment and build

resilience in the face of climate change. Through the adoption of an agroecological approach, the PSA seeks to bolster the productive capacity of small-scale family farms, promote new opportunities to generate income through the transformation and processing of agricultural products and other economic activities, and stimulate greater access of the beneficiary population to different markets and services such as technical assistance. To contribute to rural poverty reduction, the project particularly supports the development of human and social capital, placing particular emphasis on women and youth. In addition, the project works with a wide array of implementing partners, including local government, farmers' organizations, civil society groups, research institutes and the private sector. It implements an innovative territorial approach, by which it operates through groups of about four neighbouring farmers' associations with similar needs and problems. This enhances outreach and optimizes project interventions while building collaborative networks and exchange of practices among different farmers' groups that would otherwise work in isolation.

An important aspect of the PSA's strategy for increasing productivity is the promotion of agrobiodiversity through diversified production systems, as well as the restoration of the Caatinga biome and related ecosystem services. In terms of agrobiodiversity, one such activity, directed specifically at women, is the promotion of highly diverse and inclusive backyard gardens where products such as vegetables and fruit trees are grown, and aviculture and small livestock rearing are practised. A wide range of endemic fruit trees such as umbu and acerola, as well as endemic chickens and goats adapted to the local conditions, feature prominently in these backyard gardens. This activity is documented in agroecological logbooks, in which women record production, consumption, sale and informal exchange of produce and inputs. The gardens are also associated with "social technologies", which are vital for building the resilience of local populations and include cisterns to capture rainwater for human consumption and production and re-use of greywater systems that provide critical water security to families.

Support provided to a creole seed and breed programme that operates in 30 rural territories of Bahia constitutes a further intervention promoting agrobiodiversity. Through agricultural family schools that provide technical training, as well as community seed banks, knowledge exchange events, fairs, the nomination of seed guardians (see box 4) and the creation of rural interest groups and networks of creole seeds and animal breeds, the programme supports the identification, multiplication, conservation and sustainable use of creole varieties and breeds adapted to semi-arid conditions.

With regard to the restoration, or *recaatingamento*, of the Caatinga biome, the project works with 20 traditional collective grassland communities, or *fundo de pasto*, to provide training on land restoration and biodiversity conservation, re-establish soil cover with native vegetation, develop nurseries for the production of seedlings, promote sustainable agroforestry systems using native species and combat bush fires. These activities are complemented by the introduction of more efficient and renewable energy technologies such as eco-stoves and biodigesters, reducing demand for wood.

Box 4: Seed guardians celebrated for their role in safeguarding agrobiodiversity

The creole seed programme supported by the Rural Sustainable Development Project in the Semi-arid Region of Bahia or Pro-semi-arid Project (PSA) recognizes the fundamental role of local communities in safeguarding agrobiodiversity and the traditional knowledge associated with its sustainable use in diverse local production systems. At the Second Agrobiodiversity Fair, “Patrimony of the Semi-arid Peoples at the Service of Life”, held in November 2019, 125 seed guardians (both men and women) from 22 municipalities in the Region of Bahia exhibited 1,083 plant species and varieties, including beans, corn, roots, fodder and other. For each of the five categories, three female and male guardians were selected, celebrating their crucial roles in preserving agrobiodiversity. Adeline Pereira, from the municipality of Jacobina, Bahia, was one of the winning guardians and she proudly relates the importance of the cultivation of creole seeds for family agriculture: “This tradition came from my grandmother. Today I cultivate more than 200 species of seeds.”

In addition to increasing productivity through the promotion of sustainable agroecological farming practices in Bahia, the PSA also promotes value addition through processing and access to markets that recognize the biodiverse and agroecological nature of the produce. About 54 per cent of products produced by the project go through some stage of processing, thus enhancing income and market opportunities. Seventy per cent of PSA beneficiaries report an increase in income. One of the project’s most innovative strategies is its commercialization and certification schemes. In addition to providing support for organic and fair trade certification, the PSA promotes participatory guarantee systems. These systems are a participatory method involving stakeholders ranging from producers and processors to consumers and traders, who define a set of production standards and certify farmers through a peer-reviewing mechanism.

Biodiversity, environmental and socio-economic results

The following results are from a survey conducted in May 2020, in which 2,270 beneficiaries of the project were interviewed.

- **Enhanced nutrition security.** The diversification of production systems based on backyard gardens using perennial and annual crops and breeds that are adapted to the semi-arid conditions, together with enhanced access to water through small-scale irrigation systems and greywater use, enables year-round cultivation, leading to increased production for 80 per cent of the beneficiary households. As the diverse and nutrient-rich produce from the 614 backyard gardens established so far is principally consumed by the household, with only surplus sold on the market, beneficiary household nutrition security has improved significantly, with production increasing by 55 per cent among PSA beneficiaries.

- **Women and youth empowerment.** The innovative agroecological logbooks have increased awareness of the role of women in the productive sphere and given visibility to their significant contribution to household income generation and nutritional security. The skills and capacities of rural women farmers are strengthened not only through this methodological instrument itself but through their participation in collective spaces of self-organization that are formed and consolidated during this pedagogical process. With its specific focus on engaging women, youth and ethnic minorities in agricultural production, processing, commercialization and community mobilization through the development of human and social capital, PSA is empowering these groups to actively participate in decision-making processes at both farm and community levels. The success of PSA is reflected by the fact that women now hold 70 per cent of the management positions in farmers' associations benefiting from project investment.
- **Promotion of local agrobiodiversity.** The creole seed programme has so far benefited approximately 1,000 families. Thanks to this activity, local agrobiodiversity is being maintained and seeds are being improved through community-based plant breeding. In addition to celebrating traditional socio-biodiverse food cultures, the nomination of seed guardians, particularly women and ethnic minorities, is recognizing and valuing their role in conserving agrobiodiversity. Lastly, the strengthening of the creole seed network is promoting nutrition security and food sovereignty, as producers have access to a wide array of different seeds, enabling them to produce in a culturally sensitive and appropriate way.
- **Ecosystem restoration.** Thanks to the restoration activities, more than 1,000 hectares of the Caatinga biome has been restored. Youth, in particular, have been able to play a leading role in these interventions by mobilizing the *fundo de pasto* communities around these activities and establishing "Guardians of the Caatinga" groups. As a result of these activities, habitats for endemic wildlife and essential ecosystem services are being restored. Ninety-three per cent of PSA beneficiaries report the adoption of a new technology that has had a positive impact on ecosystem restoration, such as production of natural pesticides to combat pests and diseases, use of manure and biofertilizers, recovery and preservation of natural forest or the conservation of soil or water.
- **Increased access to differentiated markets.** The processing and certification of biodiverse agroecological produce has contributed to value addition and increased access to markets. The community-based nature of participatory guarantee systems has led farmers and other stakeholders in Bahia to form support groups to exchange knowledge and ideas, enabling continuous improvement in agricultural practices. Critically, the low cost of certification for participatory guarantee systems has provided even poor and disadvantaged ethnic minority and female farmers in Bahia with the ability to differentiate their produce and access a wide array of markets, including those that require organic certification.

Sixty-four per cent of PSA beneficiaries have accessed public policies mainly related to market access such as the public purchase programme or school feeding programme and credit (through the National Programme for Strengthening Family Farming) to facilitate production and marketing.

- **Resilience to climate change.** By promoting diverse production systems based on sustainable agroecological practices as well as the reforestation of the Caatinga biome, PSA is increasing the resilience of rural communities to climate shocks and improving environmental management and conservation. At the same time, alternative energy facilities at both household and community levels, for example the construction of biogas plants, eco-stoves and the installation of solar panels which pump water for small-scale irrigation, are contributing to the mitigation of climate change, including through reduced deforestation.



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Turkey: Murat River Watershed Rehabilitation Project

Key facts

Project name	Murat River Watershed Rehabilitation Project
Dates	2013-2022
Target group	87,100 poor women and men living in upland villages in selected catchment areas, as well as non-farming residents who will benefit indirectly, from 15,300 households
Financing	IFAD, Government of Turkey, smallholders

Development challenges

In the uplands region of eastern Turkey, near the source of the longest and one of the most historically important rivers of western Asia, lies a region that has a history of human settlement stretching back millennia to the time when the region was known as Mesopotamia. The Murat, or Eastern Euphrates, originates near Mount Ararat, north of Lake Van, and stretches westward for over 700 kilometers through mountainous areas. The long history of human habitation in this area has resulted in severe pressure being placed on limited environmental resources and, while Turkey's economy has grown vigorously in the last 20 years, this growth has, unfortunately, not benefited all areas and demographics of the country equally.

Project area



There has been a long-term shift from rural to urban living, unemployment is far higher in rural areas and among youth (24 per cent) and women's participation in the labour force is low, at 27 per cent. The mountainous regions in the east espouse these regional income disparities, and that gap is widening. Per capita income in these areas, which accounts for around 10 per cent of the country's total population, is a fraction of the national average. The majority of inhabitants of these villages rely on supplementary income from the state to remain in their villages, as the only alternative is migration.

Upland village households are most commonly engaged in mixed farming, mainly tending livestock with some horticulture; however, this production is seldom sufficient even for household consumption. This lack of available opportunities for income has resulted in an increase in metrics correlated with rural poverty, such as lower life expectancy, lower literacy levels, larger household size and higher unemployment.

These upland communities, many of which have lived in dire poverty for generations, have had little choice but to base their livelihoods on unsustainable use of land and vegetation, which in turn further aggravates their poverty. Pressure on the surrounding fragile ecosystems, particularly the indiscriminate harvesting of fuelwood and overgrazing by animals, has accelerated natural erosion processes, reduced the economic carrying capacity of the land and resulted in sedimentation, decreased water quality and increased the incidence of flooding and landslides. This linkage between poverty among upland village communities and the degradation of natural resources needs to be broken for the community to embark on a more productive and sustainable livelihood strategy. This change relies on a voluntary gradual change in communities' behaviour in managing shared natural resources and requires responses that combine environmental protection with livelihood improvements.



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Project responses

The Murat River Watershed Rehabilitation Project takes a targeted three-pronged approach to reduce environmental degradation in the uplands area and alleviate the socio-economic drivers of environmental damage. One of the components of the scheme focuses on aligning the livelihoods of rural village communities with sustainable use and improvement of their shared natural resources by identifying a number of suitable target areas, termed “microcatchments”, where natural resource degradation is reversible and villagers are able to make informed decisions about committing themselves to rehabilitating the degraded natural resources in their area and managing them sustainably. A collaborative approach has resulted in the production of village management plans addressing both management of natural resources and improvement of livelihoods.

Another component of the project has invested directly in the improvement of natural resources and environmental assets, in order to arrest the cycle of environmental degradation and provide a strong base for future sustainable development. Working together with the General Directorate of Forestry as well as with local village communities, a suite of measures have been designed that target and remediate areas of high environmental degradation. These measures include restoring degraded land with oak coppice rehabilitation and afforestation, and excluding grazing animals from the area for enough time to allow the seedlings to grow to a height at which they will be more able to survive long term. By building livestock watering structures, animal travelling distances and the impact of animal movement on the landscape, will be greatly reduced, as will the spread of animal diseases, and agricultural productivity will be increased.

A number of the measures also specifically aim to reduce or reverse the effects of erosion. Soil erosion is now one of the most serious environmental problems in Turkey, and is caused by extended deforestation, overgrazing and poor irrigation practices, as well as climate change. It is one of the main drivers of desertification, the process whereby previously stable dryland environments are degraded. Desertification is a massive environmental problem for many countries and is linked to numerous other environmental concerns, including the loss of biological diversity and the depletion of water resources. It contributes to a decline in environmental quality that can become progressively worse unless drastic and immediate corrective measures are taken.

The third component of the project focuses on improving livelihoods in upland communities, allowing them to maintain and benefit from the improvements in natural resources brought about by the other components. Through targeted improvements to grain and forage crop production, together with small-scale irrigation and orchard establishment, income improvements for local residents will assist in breaking the vicious cycle of rural poverty and environmental degradation.

Biodiversity and environmental impacts

Over half of villagers in targeted micro-catchment areas have signed up to micro-catchment management plans. While there have been delays related to the coronavirus pandemic, the contracts for six out of the remaining eight micro-catchment management plans were prepared in order to start implementation in 2021.

The most direct effects on biodiversity involve providing fuel alternatives to firewood. When people harvest firewood by cutting down trees or collecting woody debris, they directly (through resource removal) and indirectly (by habitat alteration) affect biodiversity.

- **Energy-efficient stoves for cooking/heating.** To date, 50 additional energy-efficient stoves have been distributed across targeted micro-catchments. This means that a total of 5,562 households have received an energy-efficient stove since the start of the project, compared with the outreach target of 1,250 households, an almost fourfold increase. This is attributable to widespread demand and the low unit cost, such that the total cost is only a fraction of the funds originally allocated for this initiative. These stoves will greatly reduce villagers' firewood foraging in nearby forest ecosystems, thereby decreasing the impact on biodiversity in those ecosystems.
- **Insulation of village houses.** The collection of firewood for heating and fuel is a significant pressure on the already limited forest resources surrounding many upland villages. As a way of helping to reduce the need for firewood collection the project has supported insulation of 3,269 households, and has already exceeded its target, as well as having additional insulation works planned for 2021. The reported reduction in fuel use in insulated houses is about 40-50 per cent, a significant win both for biodiversity in the surrounding ecosystems and for the livelihoods of the people living in them.

- **Adaptation to climate change.** This is not a core project objective, but more than half of the project interventions directly contribute to enhanced climate change adaptation capacity of the beneficiaries, for example through reduced dependence on natural resources resulting from the installation of house insulation, energy-efficient stoves and solar water heaters, new streams of income from crop diversification and improved production technologies (cattle barns, greenhouses, drip irrigation, improved cereal seeds, etc.). Climate-resilient practices cover 31,127 hectares in the area, which is more than twice the targeted hectareage.
- **Soil erosion monitoring.** There has been a 10 per cent reduction in sediment load from selected micro-catchments. Implementation of afforestation, soil conservation and erosion control measures is ongoing across six micro-catchments.
- **Vegetative cover increased.** There has been a 30 per cent increase in vegetation cover in rangelands and a 20 per cent reduction in erosion from areas was targeted with increased vegetation. Project-supported investments in two plant nurseries in Elâziğ and Bingöl are complete and the nurseries continue to show positive results in terms of increased output and diversification of seedlings produced as well as in terms of employment generation, including for women.

Socio-economic impacts

The importance of these socio-economic measures to support biodiversity in the target area cannot be understated. Breaking the link between rural poverty and environmental degradation is the way to lay the foundation for a sustainable future for farmers in the area.

The target of reaching 15,300 households has already been exceeded, with 15,679 households in the target area reached by the end of 2020. Project activities are leading to substantial increases in agricultural productivity and production. This was reported during the mission visits and was confirmed in the most recent supervision report: 14 per cent of respondents experienced an increase in agricultural productivity compared with the year before, even though the agricultural season was characterized by prevailing dry conditions. The project reported a 35 per cent increase in wheat and barley productivity per hectare compared with a project target of at least 10 per cent. The project also contributed to increased crop density (by setting up new greenhouses) and vineyard modernization (50 per cent yield increase).

- **Irrigation rehabilitation and upgrading.** The project also continues to support the replacement of critical sections of dilapidated open channels with polyethylene pipes depending on needs identified in the MCPs. This activity has proven effective at reducing water losses and triggering farmers' own investments in on-farm development.

- **Village bakeries.** In 2016, the construction of communal village bakeries became eligible for investment on the grounds of being an energy-saving initiative that would also lead to livelihood improvement. Twenty-nine bakeries have been built to date. The impact of these investments is assessed in terms of both improvement in women's health and welfare and environmental benefits (reduced firewood usage). The communal bakeries are also particularly appreciated by women, who consider them also as a social space outside the household, something that would otherwise be lacking. They are also a much safer working environment as they reduce the occurrence of health issues arising from the use of non-standard individual baking ovens.
- **Gender.** The project was nominated for and received the Annual IFAD Gender Award for 2019. Through the participatory approach and trust-building adopted in the MCP preparation, men and women in traditionally patriarchal micro-catchment villages are empowered in decision-making on improved natural resource management and demand-driven income-generating activities. Women's empowerment is fostered through their high participation in livelihood improvement interventions. Overall, the project promotes greater gender equality by reaching out to poor rural women (half of total beneficiaries), through selected investments widely corresponding to their priorities and interests, with most activities being gender-neutral, as they deliver benefits to the whole household.

As emerged during the field visits, and based on project reports, women are enthusiastic about their participation in the project, especially because of the benefits they receive at the household level through income and asset increase from energy-saving investments, which reduce their workload in the household (e.g. decreased wood collection), and agriculture investments. These include small-scale irrigation, high-value horticulture and livestock, wheat and barley production, and income diversification activities, the latter having a particularly high impact on women beneficiaries.

Gender awareness and leadership training of trainers of staff was conducted in February 2020; however, due to COVID-19 the training of beneficiaries has been delayed.

The mission reiterates the importance of implementing the recommendation on training staff and women in leadership and gender in order to maximize project results and optimize efforts, and make the project gender transformative.



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Bangladesh: Haor Infrastructure and Livelihood Improvement Project – Climate Adaptation and Livelihood Protection

Key facts

Project name	Haor Infrastructure and Livelihood Improvement Project – Climate Adaptation and Livelihood Protection
Dates	2012-2021
Target group	Smallholders and marginal farmers, fishers, landless people, poor women and small traders and microentrepreneurs
Financing	Additional component – US\$15 million (total for CALIP/HILIP – US\$133.3 million)

Development challenges

Endowed with limited land and other natural resources, and with a high population density, poverty is a pervasive problem in rural Bangladesh. In consideration of the vulnerability of Bangladesh to climatic shocks, the Government has assigned a high priority to preparing itself to deal with the negative impacts of climate change. Agricultural production has increased substantially in Bangladesh over the past 20 years. The country is now more or less self-sufficient in rice in a normal year, but is still vulnerable to shocks, and there is an ever-increasing need to produce more in response to a growing population. Much of the potential to increase production lies in areas that are relatively disadvantaged, and production is constrained by flooding.

Project area



Fish make up 60 per cent of animal protein consumed in Bangladesh. The country has enormous inland fishery resources, which include a wide variety of water bodies of different types. There are flowing rivers; oxbow lakes, which remain after a river has lost connectivity with the main flow; beels, which are permanent and seasonal lakes and wetlands; and haors, which are extensive low-lying areas comprising several perennial beels. Haor areas are rich in fish breeding and provide a nursery ground for their early growth. Fish stocks spread throughout these floodplains, which connect to the country's canal systems.

Five districts in the Haor Basin, in the north-east of the country, were selected based on their exposure to climate risks and poverty context. The majority of the population in the Haor Basin is poor, and a significant percentage is categorized as ultra-poor. The haors and beels support major subsistence and commercial fisheries, while the seasonally flooded lake margins support major rice-growing activities, and the abundant aquatic vegetation provides rich grazing for domestic livestock and an alternative source of fuel and fertilizers for the local people (Reza et al., 2002).

During the monsoon period, haors receive surface run-off water from rivers and canals to become a vast inland sea of turbulent water, with 4-8 metres of water for around six or seven months of the year. Densely inhabited villages are built on artificially constructed mounds of earth (*Haati*) and, during the monsoon season, they turn into islands, with boats being the primary mode of transport. In winter, when the monsoon flood water recedes, the underlying land becomes available for agricultural activities, including the cultivation of rice on privately held plots (Mustafa and Alan, 2008). The ecosystem of the Haor area supports many wild fish species, and the Haor fishery is a key economic resource for landless fishers.

Large-scale deforestation has taken place in the Haor region over the last 30-40 years, and this has stripped away the natural barriers that have historically mitigated wave action. A significant part of the villagers' income and time is spent fortifying the earthen mound barriers and repairing their damaged homes, and the drain on financial and human resources will only increase, as these incidents are predicted to increase as a result of the effects of climate change.

Fish biodiversity in the Haor Basin is facing a big challenge, due in part to indiscriminate use of chemicals in paddy fields and the subsequent adverse effects of chemical residues on fish larvae in waters. This has been causing a decline in fish biodiversity and productivity. However, production from ponds has gradually been increasing since 1996-97 (Department of Bangladesh Haor and Wetlands Development, 2017). Overall, fish production yields from both perennial and seasonal ponds comprise 22 per cent indigenous cultured fish, 67 per cent exotic fish and 11 per cent indigenous non-cultured fish. Among indigenous species, the Mola carplet accounts for about 1 per cent of fish harvest in perennial ponds and nearly 3 per cent in seasonal ponds. Major exotic fish have been introduced during the last few decades in Bangladesh waters. Some of these species may pose a threat to indigenous biodiversity, through their escape and the establishment of feral populations in adjacent haor water bodies (Government of People's Republic of Bangladesh, 2019).

Not long ago the Ministry of Land announced a new policy for the leasing public water bodies to groups of fishermen, at nominal cost, with the aim of securing poorer households' access to resources, so that they can benefit from the fish resources of the Haor. In order to benefit from this opportunity, the poor fishing households need help in organizing and running fishing cooperatives. IFAD's approach has been to organize beel user groups to mediate the interests of the poor in gaining access to fishing rights, albeit only to small water bodies. Traditional societal attitudes are a barrier to women fully participating in community-based management (Thompson et al., 2016).

Project responses

IFAD is working with the Government of Bangladesh through the Local Government Engineering Department (LGED) under the Climate Adaptation and Livelihoods Protection Project (CALIP), a supplementary Project of Haor Infrastructure and Livelihood Improvement Project (HILIP), to enhance the resilience of local communities to climate change impacts in the five selected Haor districts. CALIP also aims to strengthen the community and ecological resilience to climate change in the basin region.

In HILIP, beel user groups are assigned by the HILIP-LGED and consist of fishers who are from community households of similar socio-economic condition and benefit from the beel. The fishers own and manage the community beel resource throughout their management period, with the support of the project. A variety of management interventions designed to increase fish production and improve biodiversity have been implemented. Strategies include observing a closed fishing season, developing fish sanctuaries, restricting destructive fishing gear, regulating access to fishing, restocking fish in the beels with indigenous species and reducing overall fishing levels. Furthermore, the project supports small-scale aquaculture to diversify income opportunities and nutrition and reduce pressure on the beel fisheries resources. The project is expected to strengthen the institutional arrangements for beel management through a community-driven participatory approach, and to invest resources in developing water bodies to improve their productivity and biodiversity through beel re-excavation.

Some beel communities have adopted additional livelihoods such as duck-keeping and vegetable gardens, ensuring increased resource use efficiency.

The daily catch of every individual fisherman and his/her gear (catch per unit effort) was monitored for eight days in a month. The numbers and weight of all fish species in the catch were recorded. The organized catch records reflect quantity of fish catches (in kg), price of fish sales, management costs, species diversity, income from fish sales and consumption during harvesting.

Homestead ponds, ditches and seasonal floodplains adjacent to the homesteads of poor and women farmers were identified for increased production through aquaculture, with an emphasis on nutrient-rich fish, including wild indigenous species. Building enhanced technological capacity to promote high-value indigenous fish species including carp, tilapia and Mola stocked in cages in floodplains is expected to increase the incomes of these households.

Forests across the landscape are re-established using commonly found hydrophytes (plants adapted to grow in water), such as the native tree species hijal (*Barringtonia acutangula*) and korocho (*Ponogamia pinnata*). The project aims to reforest land and encourage communities to reforest lands around their villages with staggered strips of trees that make up a defensive “wall” against wave action. In addition to its primary objective of neutralizing wave action, this intervention also facilitates the promotion of new business opportunities for women-led common interest groups (seedling production), provides habitat for fish spawning and contributes to carbon sequestration.

Results

During the CALIP project period, 2016-2019, training was provided to a total of 130 batches of pond fishers in the five Haor districts, 25 in each batch, totalling 3,251 farmers. In addition, 89 farmer exchange visits to successful farms were organized, involving 2,270 farmers. Twenty-eight Mola brood ponds were established in the five districts, and a total of 84 Mola carp demonstration ponds were established. During the project period, a total of 2,325 farmers in 93 batches visited the successful hatcheries, both government and privately owned, as part of their exchange visit.

Biodiversity and environmental impacts

- **Ecosystem restoration.** In total, 213,000 swamp trees have been planted, and plantation of flood-tolerant trees is expected to have a positive effect on the problems with heavy siltation of some of the beels. This is also expected to reduce the workload of farmers as less time would be spent on restoring and rebuilding what has been damaged by flooding and flash floods. Village protection systems can also withstand high-intensity wave action.
- **Enhancement of biodiversity.** The unique and rich biodiversity in the Haor Basin ecosystem has been under pressure for some time. In order to understand the changes, focus group discussions and key informant interviews were carried out with knowledgeable senior people in the project areas. Selected ecological indicators discussed were: (A) flora: aquatic flora,

creepers, herbs, shrubs and trees; (B) fauna: amphibians, mammals, reptiles, resident birds and fish. The trend in both flora and fauna has been decreasing over time, and it is clear that aquatic ecological degradation has become an alarming issue for the Haor Basin region.

However, the project is beginning to result in some positive signs. Monitoring studies conducted by WorldFish present a very positive outlook on the status and trends of fish production and biodiversity in the beels and show that the project's interventions have generated tangible benefits. Total fish production in the project's beels increased from 543 kg/ha in 2012/13 to 733 kg/ha in 2017/18.

In terms of wild biodiversity, the number of fish and prawn species increased from 105 to 126 during the same period. To measure biodiversity, the species-wise production rates were used to estimate the Shannon-Wiener diversity index (H'), a widely accepted measure of biodiversity. For comparison, non-project beels recorded declining productivity and biodiversity in the same time frame.

Preserving the habitats of threatened species is important for conserving fish biodiversity. The study revealed that the haor water bodies are a suitable habitat for many critically endangered and vulnerable fish species. It also showed that around 20 main species accounted for the majority of the catch, with minor carps the dominant species. In fact, most of the water bodies managed in the project were species rich, and the number of different species in haor, beel and river habitats appeared to be somewhat higher than in similar habitats in non-project sites. These data suggest that the majority of HILIP sites showed considerably healthier biodiversity than water bodies outside project intervention.

- **Increased resilience to climate change.** Construction of ponds involves some disturbance to the ecosystem in the form of clearance of jungle on dykes, excavation or re-excavation of ponds, increasing the height of dykes, preparation of ponds, for example drying, adding lime to water and making the ponds accessible to rural roads. However, the intensity of fish culture in both perennial and seasonal ponds is lower in haor districts than in ponds outside the project, and there have been no reports of adverse or conflicting impacts on ecology. However, this needs further research. In any case, the establishment of ponds in an area prone to serious and widespread seasonal flooding reduces the impacts of floods in the local communities, providing some benefit from an otherwise adverse situation. The culture of Mola, a locally adapted species, as a result of the project has reportedly had no adverse environmental impacts and does not appear to hamper the growth of other fish species (Government of People's Republic of Bangladesh, 2019).

Socio-economic impacts

- **Enhanced nutrition security.** The collaboration with WorldFish shows promising results in terms of promoting polyculture systems, which increase fish species and catch relative to the available water body area. Catchability was increased in all districts, with the annual average catch per seine net ranging from 7.36 to 23.93 kg. Overall, fish production was substantially increased, by 113 per cent, during the period from 2016/17 to 2019/20. Small fish is a common food and an integral part of carbohydrate-rich diets of the much of population in Bangladesh. Small fish are a rich source of animal protein, essential fatty acids and vitamins and minerals, including long-chain omega-3 fatty acids, iron, zinc, calcium, iodine, magnesium and vitamins A, B12 and D. These fish are generally consumed whole, which increases the bioavailability of the essential minerals and vitamins in households faced with critical nutritional deficiencies and other forms of vulnerabilities. The poor households in the haor areas can produce small indigenous fish at minimum cost, provided they are given proper training.

Along with cultured species, the natural local fish have provided essential nutrients and socio-economic benefits for a vast number of poor and vulnerable people in the Haor Basin region. The approach could be extended to more species of natural local fish beyond study areas to ensured nutrients and biodiversity for future generations (Government of People's Republic of Bangladesh, 2019).

- **Empowerment of local communities.** Responsibility for management of water bodies has been transferred to the beel users group and they have effectively implemented a variety of management interventions designed to increase fish abundance, biodiversity and fisheries' yields by reducing fishing effort in the water bodies to protect their principal species. The interventions included observing closed fishing seasons, controlling destructive fishing gear, habitat restoration, controlling fishing effort, and developing and maintaining fish sanctuaries. The project also supports monitoring of fish catches and stocks, and, where necessary, restocking with locally adapted species. The fisheries' management measures under HILIP had been able to increase production and also improve the management of fisheries' resources.
- **Women's involvement in fishery.** Traditionally, Bangladeshi women are involved in fish culture or fishing-related activities in the pre- and post-harvest stages of the production process. Haor pond aquaculture diversified the scope of their involvement, through service-providing opportunities such as cleaning weeds; pond cleaning; testing water quality; applying fish feed, fertilizer and lime; and making decisions in respect of fish culture. Demographically, the fish-farming households of the HILIP area have 118 males for every 100 females. An area that could be explored further is the possibility of gender-inclusive fishery management approaches in project water bodies. About 76 per cent of women are directly involved with grading and 11 per cent are involved with fish drying.

- **Increased revenues.** The intervention has resulted in the improvement of yield from ponds and has generated higher income and nutritious food for the fish farmers. Open catch was more than double major catch. Open catch is especially important for poor fishers' livelihoods. Therefore, water bodies with less potential in terms of productivity and water extent can be considered for seasonal stocking with rapid-growing native species, i.e. Mola and carps. This enhances production as well as the income of the participating communities. The project component on livelihood protection has contributed to an increase in sustainable incomes combined with rural livelihood diversification to reduce poverty. Furthermore, the project supports a cooperative approach for leasing beels, management costs and for sharing of revenue generated from fish production.

Water body leasing policy is crucial for enabling the inclusion of poor people, and the social and human capital generated through beel development and community management would have been difficult to achieve without the Ministry of Land granting the lease to the beel user groups for the management of the beels. The project results show that it is possible to reap benefits from successful common resource management and conservation practices. The new climate-resilient value chains developed in the project constitute "green economic" activities and can expand as demand for slope stabilization, reforestation and handicrafts grows. Both excavation of beels and floodplain afforestation are highly desirable for the enhanced production of fish, and present an excellent opportunity for demonstrating ecosystem-based adaptation. In order to generate additional incomes, there is also great potential in transforming the Haor Basin into an ecotourism destination, given its unique ecological context and potential for bird watching.



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Burkina Faso: Participatory Natural Resource Management and Rural Development Project in the North, Centre-North and East Regions

Key facts

Project name	Participatory Natural Resource Management and Rural Development Project in the North, Centre-North and East Regions (Neer-Tamba)
Dates	2014-2022
Target group	Subsistence farmers and other stakeholders in the north of the country
Financing	IFAD, Global Environment Facility, Government of Burkina Faso, beneficiaries

Development challenges

Located in the heart of West Africa, Burkina Faso is a landlocked country covering 274,000 km². Bordering on six countries – Benin, Côte d’Ivoire, Ghana, Mali, Niger and Togo – Burkina Faso is a crossroads for trade in the subregion and a country of transit between the Sahelian countries of Mali and Niger and countries along the coast. The economy of Burkina Faso has shown dynamic growth despite unfavourable conditions as a result of the low price of gold on international markets. Its economy was one of the fastest-growing in the world in 2019 according to the World Bank, with its robust export sectors (mining and cotton) driving much of the economy.

Project area



Agriculture occupies 86 per cent of the economically active population, and the sector's contribution to GDP is estimated at around 35 per cent on average. However, agricultural production in Burkina Faso relies greatly on rainfed crops and is confronted with episodes of cyclical droughts that intensify with climate change, which is especially impactful considering all agricultural production occurs during a single rainfall season in the country.

The country is currently on the verge of a potential food security crisis due to both the COVID-19 pandemic and growing security issues related to the presence of non-state armed groups. In the Sahel region, some 11,000 people are facing a "phase 5" food catastrophe – this is the highest level under the Integrated Food Security Phase Classification system drawn up by the United Nations and aid agencies and indicates famine conditions. Aid officials have indicated that it is the first time in more than 10 years, perhaps longer, that part of Burkina Faso is considered to be in "phase 5". In 2019, Burkina Faso was the site of one of the fastest-growing displacement crises in the world, largely related to security and food security issues.

Even before these issues emerged, there were strong internal and external migration movements. The provinces most affected by issues of environmental degradation are in the North and Centre regions and in the Sahel, which causes workers to migrate from these areas to regions further south, where conditions are more favourable. The North region grapples with accelerated degradation of the environment, with over 46 per cent of the area severely environmentally degraded. This degradation can be attributed to a variety of factors, such as loss of plant cover and subsequent erosion, cyclical losses of soil fertility, significant run-off and evaporation of water sources, irregular and low levels of rainfall, exploitative levels of timber cutting, bush fires and continued soil exploitation. Many of these issues reflect the link between rural poverty and environmental degradation, leading to a vicious cycle in which inhabitants who lack options because of their inability to obtain income are forced to overexploit natural resources through inappropriate agricultural practices.

Project responses

The project seeks to transform the agricultural sector to ensure sustainable food security in sub-Saharan Africa, and will target the underlying causes of environmental degradation, benefiting both the inhabitants and ecosystems in the target area.

The overall objective is to ensure that the Government of Burkina Faso adopts and scales up food security policies and activities that build resilience and sustainable management of natural resources and the environment. The development objective is to ensure, within the framework of the Neer-Tamba project, that the agroecosystems that are key to food security in the north of Burkina Faso are managed sustainably. The project has three main objectives and, although the pandemic and ongoing security issues in the country have presented difficulties since the project was designed, implementation of some objectives has gone ahead.

The first objective engages stakeholders, at national and regional levels, to promote collective action and coherent policy decision-making on the use of natural resources around local communities. This ensures that environmental concerns are included at all decision-making levels, and incorporates training and production of briefs for distribution to all stakeholders. It also strengthens linkages between regional councils for food security and in terms of monitoring the environmental impact of interventions.

The second part of the project focuses on intensifying, diversifying and adapting practices for large-scale transformation of agroecosystems in the target area. This begins by engaging with a wide variety of users of watersheds impacted by lowland development, and builds a participatory mechanism to design project management delegation agreements covering sustainable management of sub-watersheds as a common public good. Any governing bodies are inclusive and representative of the various stakeholders, especially women and young people. After and alongside this target, the project scales up proven sustainable water catchment and agroforestry technologies to the whole agroecosystem of sub-watersheds surrounding lowlands, with 6,500 hectares of land protected by sustainable water catchment measures as a target.

These measures involve a number of agricultural improvements, which also act in a restorative way on the surrounding natural resources, such as zai planting pits, micro-catchments, stone barriers and planting of cover crops. These agricultural improvements have significant impacts on surface run-off, erosion and pollution reduction as well as the ability of the soil to regenerate healthy organic material. For more information see box 5.

This objective also involves setting up an investment fund to back environmentally friendly microprojects or renewable energy promoters, with a target of 900 women's and youth groups carrying out microprojects to process or market at the sub-watershed level, and 60 innovative microprojects on bioenergy to be carried out in the North region. This initiative is subsidized in particular for vulnerable groups of women and young people and works to promote sustainable management of local forest resources at the sub-watershed level.

Box 5: Soil restoration techniques

Developed from indigenous knowledge, these methods allow agriculture to become regenerative, benefiting the fragile soils of the northern region and making the most of the unpredictable rainfalls. Zai and half moons can be used on cropland, pastoral land or forests, and the subsequent successful planting of native trees and grass on pastoral land and forests provides tangible benefits to local biodiversity.

The zai technique

This technique involves digging a grid or matrix of shallow holes, 20-40 cm deep, and laying organic fertilizer or manure in the bottom. The organic material helps to retain run-off water and to regenerate degraded, hardened or unproductive soils. It does this by promoting nutrient cycling and the development of soil organic matter.

Yacouba Sawadogo, a farmer from Burkina Faso, pioneered the approach of adding manure and compost to the holes. This organic material attracts termites, which build extensive tunnels through compacted ground, further helping to break it up. Zai holes can increase the yield of trees, sorghum and millet by up to 500 per cent.

The stone bund method

This method, similar to the building of berms along contour lines in permaculture, is aimed at slowing water running over the surface of sandy clay or gravel soil on a slope. By building pebbles or stone walls perpendicular along the slope, the run-off speed is slowed and the effect of erosion is decreased.

The half-moon method

The half moons themselves are semi-circular depressions, 2-6 metres in diameter. They are dug on gentle slopes to retain water, and the earth that is removed from the depressions is deposited on the lower edge of the pits. These methods increase the level of water soaking into the soil and prevent erosion of and nutrient leaching from the topsoil.

Additional activities such as composting, micro-irrigation and the promotion of income-generating and environmentally friendly activities improve resilience and adaptation capacity of populations and ecosystems to climate change, the most damaging results of which particularly affect the target northern region. Increasing the use of organic manure on soils improves not only their fertility and their capacity to yield food, but also their water retention capacity, thus contributing to better resilience of soils and plants in the face of climate change effects in the coming decades.

The third aspect of the project assesses project impact in terms of sustainability and resilience³ to improve decision-making in the agricultural sector and its consequences for food security. This involves developing and reporting on environmental indicators, as well as indicators related to food security.

Biodiversity and environmental impacts

Overall, despite the logistical difficulties posed by the COVID-19 pandemic and ongoing security concerns in target areas, the project has been found to be contributing to better management of the environment and natural resources in the area.

The project, through the various actions implemented (land development, the promotion of biologically safe pesticides and fertilizers, education of inhabitants on environmental issues and change in the use of non-forest land) is contributing significantly to the improvement of plant cover and the creation of carbon sinks. The project has plans to plant 84,928 trees across the three intervention regions, and recent involvement of the National Forest Seed Centre (CNSF) (box 6) has made it possible to provide participants of the schemes with plants and seeds adapted to the North region (625 kg of seeds, 10,965 plants and 47 beneficiaries). Planting was carried out with native species, such as *Acacia*, adequately adapted to weather the coming effects of climate change. Wherever there was planting, a plant-monitoring mechanism to ensure a satisfactory success rate was put in place on each site. A total of 58,349 seedlings have been planted for the protection of developed lowlands and the establishment of plantations in village communities. These tree plantings, once complete, will assist in reducing erosion and desertification and, alongside biomass produced by cereals on restored cropland, will contribute to a reduction in CO₂ emissions of 1,730,631 tons. This represents a significant contribution of 12.57 per cent towards Burkina Faso's commitments under the Paris Agreements. These techniques will also help to conserve plant biodiversity and create and preserve habitats for small wildlife species.



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3. Resilience, according to the Food and Agriculture Organization of the United Nations (FAO), is the capacity to react to catastrophes and crises, to prevent, anticipate, absorb, adapt to or recover from a shock having an impact on nutrition, agriculture, food security and food safety efficiently, sustainably and in a timely manner.

Box 6: Partnership with the National Forest Seed Centre [Le Centre National de Semences Forestières] (CNSF)

The National Forest Seed Center (CNSF) has been an invaluable partner for IFAD's project delivery in Burkina Faso. It was created in 1983 following the great droughts in the country of the 1970s, with the mission to "contribute to the fight against desertification and to the reconstitution of plant cover in the context of a changing climate". To carry out its mission, specific objectives have been defined, namely:

- supporting programmes for restoring plant cover by producing good-quality seeds and ensuring their dissemination;
- contributing to research on local forest species, to their promotion, and to the control of conditions for the conservation and germination of seeds, and their silviculture;
- contributing to the self-promotion of rural inhabitants through a sustained transfer of technical knowledge to the rural world.

Its excellence in the field of research on forest genetic resources in the Sudano-Sahelian subregion has earned it several national and international recognitions, and the CNSF has proved invaluable in providing local species adapted to the agroecological conditions of the North region (*Saba senegalensis*, *Parkia biglobosa*, *Vitellaria paradoxa*, *Adansonia digitata*, *Balanites aegyptiaca*, *Bombax costatum*, *Lannea microcarpa*, etc.) for the project.

The CNSF produces an average annual of 203,083 plants of three categories of species (forest, fruit and ornamental). The Neer-Tamba project has contracted with the CNSF to acquire herbaceous seeds for the recovery of degraded lands and grafted plants to support food production across the North region.

In collaboration with Neer-Tamba, the CNSF has also worked to provide training in the techniques of assisted natural regeneration, water and soil conservation, and soil defence and restoration to stakeholders in the North region, thus contributing to the efforts to increase environmental and food security.

In addition, several microprojects relate to the creation of nurseries and/or the planting of tree species such as baobab, moringa and acacia, and thus contribute to the reforestation of rural areas, generally close to homes. As moringa and baobab leaves are rich in vitamins, and thus can be harvested and sold to local consumers, making an important contribution to their diet, these gardens also have the potential to become a major source of income for groups of women as well as other project beneficiaries. In addition, the sustainable use of NTFPs is also encouraged by many management plans, which promote culture of the fruits of shea, balanites and néré, in particular through the partnership with the CNSF. Planting native trees such as shea and néré helps to avoid overexploitation of natural stands of trees. Wire fences have been erected on all 32 market garden sites supported by the project, amounting to a total of 26,393 km of fencing enclosing a total 41 of hectares.

Socio-economic impacts

Despite facing severe constraints due to the COVID-19 pandemic, the progress of the project is steady. A total of 5,694 hectares in the lowlands and 43,852 hectares in the highlands, representing 92 per cent and 118 per cent respectively of the overall targets set in the design phase, have been developed. The support fund has funded a total of 2,685 microprojects with 13 business plans. Sixty-three facilitators have been trained to help the local population to create profitable businesses while conserving forest resources.

Overall agricultural returns, while not as high as targeted, are better than in previous years. This increase in production has led to a need to store or otherwise preserve product for which there is no immediate market. As a result, the project has undertaken the construction of 12 rice storage warehouses and 13 onion canneries, of which six have been completed (three of each type). This means that farmers are not required to sell all their production at harvest time, at reduced prices. This infrastructure will ultimately result in increased revenue for farmers, spread over a longer period, allowing them to rebuild their working funds and acquire inputs.

The functional literacy component project has already exceeded its targets. A total of 36,147 people, including 26,959 women (74.58 per cent), have been trained, representing 125 per cent of the project target.

The project has also been particularly successful in reaching young people: 104,375 young people have benefited, compared with a target of 79,838 (130 per cent).



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Conclusions and the way forward

The case studies show how IFAD has been tackling the challenges of protecting and enhancing ecosystems while increasing their benefits to smallholders and global benefits. The case studies are from various contexts, but they have a number of common features. These include:

- reducing direct pressures on biodiversity through sustainable smallholder agriculture
- increasing communities' nutritional security through the promotion of agrobiodiversity
- using a participatory approach that builds on the existing capacities of rural people and empowers them, by developing solutions that are culturally sensitive and appropriate to the target groups of each project
- promoting biodiversity, including agricultural biodiversity, as a strategy to increase smallholders' resilience to climate change
- actively seeking out opportunities for the most vulnerable populations, such as women and indigenous peoples, to improve their livelihoods and participation in decision-making.

Looking ahead, IFAD will seek to further enhance its contribution to biodiversity conservation, going beyond "doing no harm" and advocating for active engagement with biodiversity issues in the projects it supports. IFAD is developing its own biodiversity strategy to work strategically with biodiversity and capture more fully the potential improvements that biodiversity can bring to project target recipients.

It will build on established partnerships in this area, such as with the Global Environment Facility (GEF), Biodiversity International, other United Nations organizations, and national governments and research organizations – and seek to refine its approach using initiatives such as the Rural Resilience Programme to address resilience holistically.

Working with its partners, as well as with smallholders themselves, IFAD is working to support both “life above land” and “life below water”, corresponding to SDGs 14 and 15, respectively. IFAD’s multidimensional approach to promoting biodiversity also helps countries to achieve other SDGs. Given its mandate to eradicate rural poverty and food insecurity, and by investing to raise smallholder productivity and incomes, IFAD also contributes to other SDGs, such as SDGs 1 (no poverty), 2 (zero hunger), 10 (reduced inequalities), 5 (gender equality) and 8 (decent work and economic growth).

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