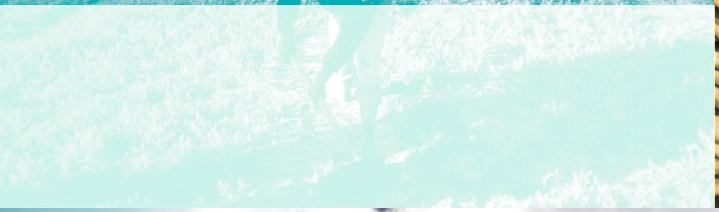






RESILIENT

Zero-Carbon, Risk-Informed, Sustainable

UNDP´s Work in Climate Change, Disaster Risk Reduction, and Energy, 2015-2017

UNDP

Empowered lives.
Resilient nations.


About this Report

Throughout this report – which is comprised of 15 country case studies – readers will find examples of climate action, disaster risk reduction and recovery, and sustainable energy. In each case, efforts have been made to emphasize the integrated approach to these work streams and similarly, the linkages and benefits that each extends to the others. Better cook stoves protect forests, thus reducing the risk of soil erosion and landslides while maintaining carbon sinks; early warning systems provide advanced disaster risk reduction while enabling local-level adaptation; and resilient recovery helps to put in place better energy systems and address long-term risks. In each example, the message is clear: zero-carbon and risk-informed sustainable development is key to long-term prosperity.

Acknowledgments

December 2017

304 East 45th Street, 9th Floor
New York, NY 10017 USA
www.undp.org

This report was developed and written by Carl Mercer, Jan Kellett, and Monica Trujillo, based on the detailed inputs from UNDP's Regional Team Leaders and Country Office specialists. Project management of the report was by Carl Mercer with editorial oversight by Jan Kellett.

Inputs and Peer Review: Mayrilian Acosta, Azza Aishath, Marcel Alers, Ababu Anage, Armen Chilingaryan, Salah Dahir, Aliou Dia, Gemma Dalena, Danielle Evanson, Jacinda Fairholm, Stephen Gold, Armen Grigoryan, Aida Hadzic-Hurem, Phearanich Hing, Min Htut Yin, Moortaza Jiwanji, Gordon Johnson, Amanullah Khan, Kishan Khoday, Asad Maken, Joan Manda, Usman Manzoor, Wubua Mekonnen, Chisa Mikami, Matilde Mordt, Ramraj Narasimhan, Napoleon Navarro, Sothini Nyirenda, Sujala Pant, Kevin Petrini, Angelika Planitz, Abdul Qadir, Ismael Sayyad, Jihan Seoud, Vijaya Singh, Ahmed Shifaz, Ben Twinomugisha, Krishna Vatsa.

Design: In-House International (weareinhouse.com).

Copy-editing: Susan Guthbridge-Gould.

RESILIENT

Zero-Carbon, Risk-Informed, Sustainable

UNDP´s Work in Climate Change, Disaster Risk Reduction, and Energy, 2015-2017

Empowered lives.
Resilient nations.

OVERVIEW

The size of our world economy is expected to triple by 2060. More than two thirds of this growth is expected to come from developing countries. Over the same period the world's population is projected to rise by three billion people, of whom more than two thirds will live in urban areas. Demographic change combined with climate change means that exposure to disaster risk is growing rapidly. This presents the world with unprecedented challenges. For developing countries, both less able to cope with the impact and more likely to be affected, these challenges are particularly severe. They face the threat of decades of development gains being rolled back, poverty becoming entrenched, and a rise in instability.

The need for action is urgent. Risk, vulnerability and the protection of countries and communities from climate change and disaster are central issues indivisible from sustainable development. Action is called for in the 2030 Agenda for Sustainable Development and major international agreements on disaster risk, financing development and our changing climate.

UNDP takes an increasingly integrated response to these challenges as well as opportunities inherent in solutions to them, and this approach is supporting countries to deliver development that is zero carbon and risk-informed and therefore sustainable. We enable countries and communities to protect and accelerate development gains and deliver progress against the Sustainable Development Goals (SDGs) through efforts to reduce disaster risk, tackle emissions, transition to sustainable energy and adapt to the impacts of climate change.

This report, chronicling efforts since 2015, looks specifically at the Sendai Framework for Disaster Risk Reduction, the Paris Agreement, and the Sustainable Development Goals of Agenda 2030. It reflects on the work supported by UNDP at country and regional levels, and emphasizes how these actions support progress. The report highlights how action areas are interconnected and how progress on one is progress on another, showcasing initiatives such as the use of reforestation to reduce greenhouse gas emissions and simultaneously provide protection against land degradation and sea-level rise; solar projects that enhance energy access while empowering women and students; disaster recovery processes that strengthen infrastructure and institutions against future threats; and how Nationally Determined Contributions (NDCs) are the crux of each country's commitments to the Paris Agreement.

and support disaster relief when needed.

Climate Action

Adoption of the Paris Agreement in 2015 set the world on an ambitious and critical path towards resilient and zero-carbon development. Action on climate change contributes directly to Sustainable Development Goal 13 and addresses many other SDGs. Protecting our crops from drought contributes to food security; protecting our infrastructure from storms supports sustainable cities and communities; and addressing the increase in vector-borne diseases due to changing temperatures helps ensure children are healthy. Action on climate is a positive opportunity rather than a burden, with improvements in health and the environment, and new commercial opportunities in energy, transportation and agricultural adaptation.

In terms of global policy, UNDP works with countries to develop and deliver on the goals of the Paris Agreement. Critical to this are the Nationally Determined Contributions that each country has put forward. For its part, UNDP has partnered with the UNFCCC, European Union and UNEP on global and regional workshops to support countries throughout each step of the process. Since 2014, UNDP and partners have held a series of 15 regional dialogues and three global workshops, together attracting nearly 2,000 participants from around the world. Focused on identifying nationally-appropriate climate targets, these dialogues have since moved on to formulating and putting in place plans of action to deliver results.

UNDP is a founding member of the German-led NDC Partnership and is working closely with partners to coordinate and accelerate progress. Looking ahead, NDC dialogues will continue through the end of 2018 and adopt a sub-regional approach thereafter. Increasingly, the dialogues will focus on actions that can be taken in specific sectors to contribute to NDC targets, and will seek to engage the private sector in these efforts.

In supporting climate action, UNDP's network of nearly 170 country offices is currently engaged in hundreds of climate action initiatives that help reduce carbon emissions and strengthen adaptation. With a $3.2 billion portfolio, and expenditure of nearly $600 million in 2015/2016, UNDP remains the largest service provider of climate action in the UN system.

Sustainable Energy

UNDP's work on sustainable energy is built around the core elements of Sustainable Development Goal 7 on clean energy, specifically *energy access, energy efficiency* and *renewable energy*. During the year 2015/2016, UNDP sustainable energy projects amounted to nearly $325 million globally.

Access is the immediate goal for countries struggling to meet energy needs. UNDP works with countries and communities to put in place systems that provide energy in schools and hospitals, and which help deliver improved livelihoods for thousands of communities and families.

To improve efficiency, UNDP works with countries, communities and private sector partners to improve energy usage across infrastructure, social services and industry. This includes measures to improve lighting and heating in apartment complexes, hospitals and in transport systems. On a smaller scale, UNDP works with households throughout much of the developing world to improve efficiency in cooking and lighting.

The ultimate goal of UNDP's energy work is to support countries in pursuing a zero-carbon pathway built on a shift to renewables. Governments are putting in place the enabling environment that attracts foreign investment in energy projects. From Tunisia to South Africa to Uruguay, UNDP works with governments to simplify and clarify laws, policies and financial regulations that help de-risk investment.

In increasing numbers of countries, work across the three areas of access, efficiency and renewable solutions is integrated, not only transforming the energy sector but also providing significant change across lives, livelihoods, access to basic services and the delivery of development in the long term.

Disaster Risk Reduction and Recovery

Natural hazards such as storms or earthquakes do not necessarily need to result in disaster. UNDP's work on disaster risk reduction (DRR) and recovery recognizes this and, through partnership with governments and communities, helps put in place the systems, capacities and processes for *risk-informed development,* thereby protecting livelihoods and infrastructure.

UNDP supports progress on the Sendai Framework for Disaster Risk Reduction by working with partners across five critical themes: improved access to risk information; enhanced early warning and preparedness; strengthened climate and disaster risk governance; resilient recovery; and local and urban action. UNDP's portfolio in DRR includes $2.1 billion since 2005, with over $400 million invested in 2015/2016.

Collaboration and cooperation are essential to this work. As such, UNDP participates in a number of partnerships that aim to coordinate, accelerate and standardize efforts. This includes the *Global Preparedness Partnership* (GPP), which strengthens and standardizes disaster preparedness at country level; the *tripartite agreement on disaster recovery* between the World Bank, UN and European Union, which aims to support Post-Disaster Needs Assessments (PDNAs) and recovery planning following a disaster; and the Capacity for Disaster Reduction Initiative (CADRI), which remains the UN's primary partnership focused on strengthening in-country capacities to achieve the goals of the Sendai Framework.

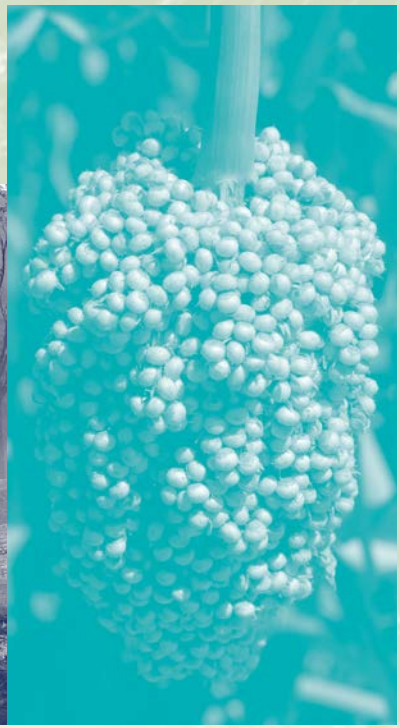
Partnership with the private sector is increasing. As a member of the *Insurance Development Forum* (IDF), UNDP works with the World Bank and leading global insurance companies to strengthen the role of the insurance sector in developing countries. On the preparedness side, the *Get Airports Ready for Disaster* (GARD) initiative is a partnership of UNDP and Deutsche Post DHL Group, with funding from Germany, to help airports manage

On the adaptation side, UNDP works with countries to respond to the ongoing impacts of climate change and to prepare for future impacts. UNDP's adaptation portfolio supports over 110 countries to integrate current and future climate risks and uncertainties into national and sub-national development efforts. This includes climate-resilient agriculture and food security; promoting sustainable water resource management; ensuring sustainable coastal zone development; addressing climate-related extreme events and risks; providing access to early warning systems and climate information for enhanced planning; and pursuing ecosystem-based adaptation approaches.

Developing low-emission projects that support national climate targets is part of UNDP's work on climate mitigation and also contributes to sustainable energy efforts. This includes support to develop Nationally Appropriate Mitigation Actions (NAMAs) that span a variety of sectors, from crops to steel production to transport. Given that deforestation and forest degradation accounts for more than 10 percent of global greenhouse gas emissions, UNDP supports their reduction through conservation and sustainable management of forests. The aim is to ensure that emissions from forests will be reduced and carbon stocks will be enhanced while at the same time sustainable, equitable, low carbon development paths will be identified and put into practice.

About this Report

Throughout this report – which is comprised of 15 country case studies – readers will find examples of climate action, DRR and sustainable energy. In each case, efforts have been made to emphasize the integrated approach to these work streams and similarly, the linkages and benefits that each extends to the others. Better cook stoves protect forests, thus reducing the risk of soil erosion and landslides while maintaining carbon sinks; early warning systems provide advanced disaster risk reduction while enabling local-level adaptation; and resilient recovery helps to put in place better energy systems and address long-term risks. In each example, the message is clear: zero-carbon and risk-informed sustainable development is key to long-term prosperity.



UNDP'S WORK IN CLIMATE, DISASTER AND ENERGY: THE STORY IN NUMBERS

The Big Picture Over Five Years

1,600

US$ Millions spent on **Climate**

962

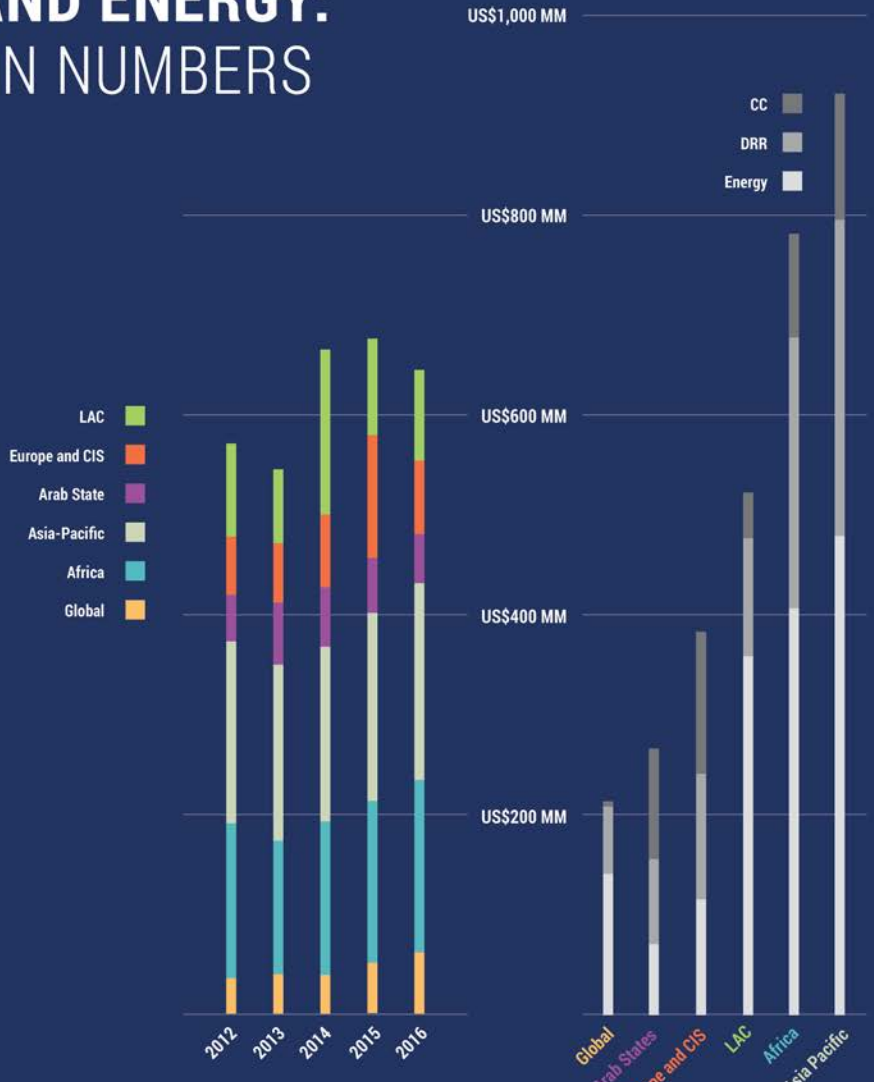
US$ Millions spent on **Disaster Risk Reduction**

538

US$ Millions spent on **Energy**

3,099

US$ Millions spent in **Total**



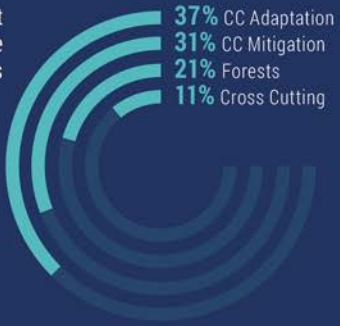
How Much is Spent, Where

What it is Spent on, Where

Investment that Underpins Sustainable Development:
Data from 2015 and 2016

Climate Change, by Region, by Theme

UNDP's Investment In Climate By Thematic Areas

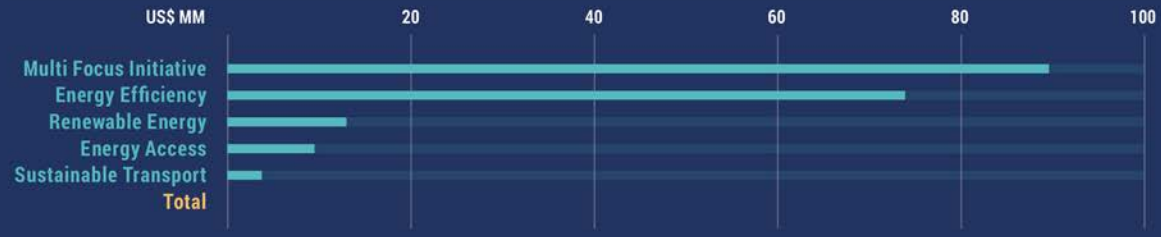


Disaster Risk Reduction, by Region, by Theme

UNDP's Investment in DRR Since Sendai
US$430 MILLION

Pearcentage of DRR Expenditure by Thematic Areas(2015-2016)

Sustainable Energy, by Theme



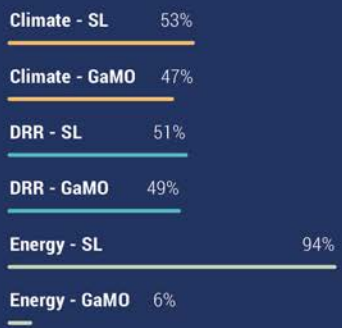
Points of Interest

From Intended To Implemented:
UNDP Support To Paris Commitments

Recovery: UNDP's Significant Investment

5 YEARS 2012-2016 =
US$388.9 MILLION

Gender, Critical Across All Work



Integration Of Climate Adaptation And DRR Since Sendai

28% 2014

35% 2015-2016

Underpinning the Sustainable Development Goals:
Critical Global Processes

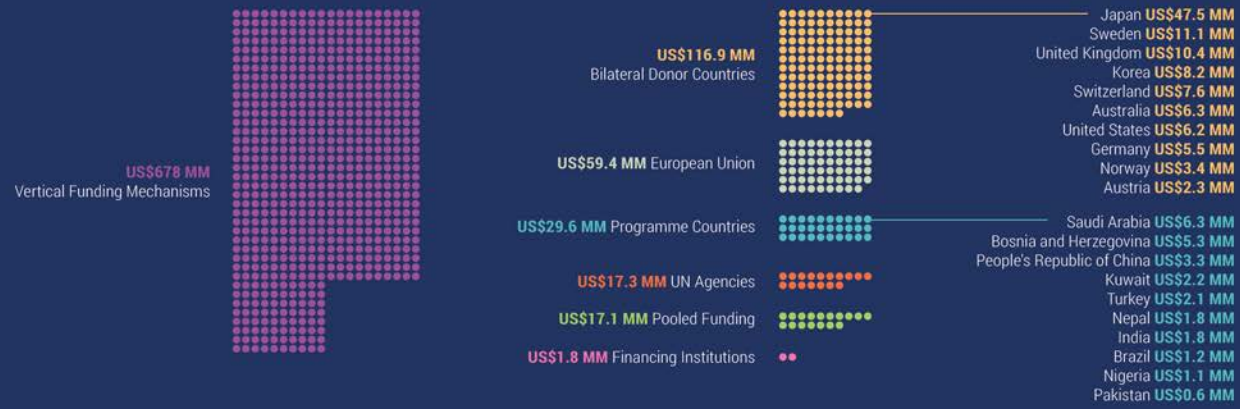
Climate Change:
The Paris Agreement
Helping developing countries negotiate a robust climate agreement that will ensure development is climate-proofed

Disaster Risk Reduction:
Sendai Framework
Working with member-states to deliver a final framework that highlights the critical areas of risk governance and risk-informed recovery

World Humanitarian Summit
Ensuring that issues of climate and disaster risk are mainstreamend into long-term action in humanitarian contexts.

Financing for Development: Addis Ababa Action Agenda
Successfully advocating for risk reduction and resilience to be fundamental to the financing of sustainable development.

Investments In Risk-informed Zero-Carbon Development:
Income for 2015-16



AFRICA

ETHIOPIA

Strengthening resilience is a priority in Ethiopia given that 70 percent of its total land area is dry sub-humid, semi-arid or arid and the country is historically prone to climate and disaster events. Through national policy support, enhanced early warning and preparedness measures and community adaptation initiatives, UNDP works with Ethiopia to protect lives and livelihoods while accelerating progress towards the Sustainable Development Goals. For example, the Government is taking action to transition to a climate-resilient green economy, reduce carbon emissions and expand forest coverage, with support from UNDP.

70% of land area is dry or arid

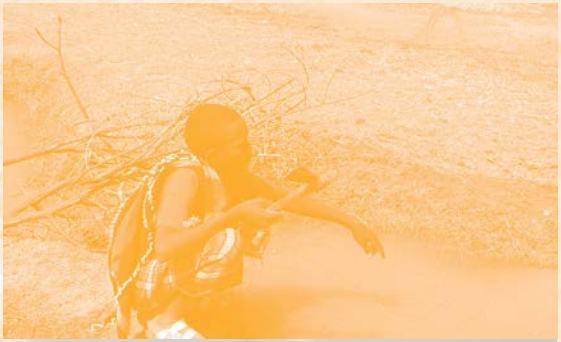
80% of energy comes from firewood/ charcoal

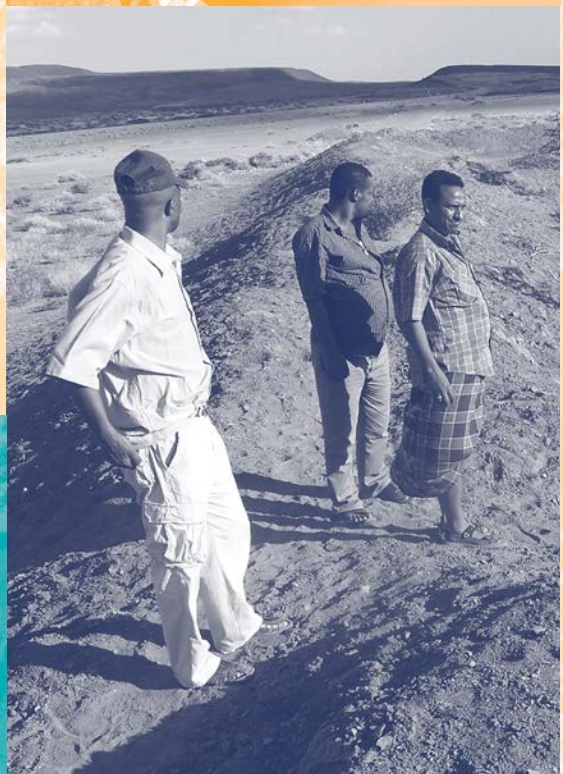
50% decreased forest coverage in last three decades

10.2 mm people affected by 2016 drought

Climate Change Adaptation and Mitigation

The Climate-Resilient Green Economy (CRGE) initiative, launched in 2011, represents Ethiopia's strategy for achieving both climate change adaptation and mitigation objectives. With ambitious plans to help the country attain the triple goals of economic growth, net-zero emission and strengthened resilience by 2025, the initiative and interrelated measures help strengthen the integration of climate concerns into development planning and programming. UNDP helped coordinate the preparation and launch of a finance mechanism, the Climate-Resilient Green Economy Facility, to mobilize domestic and international funding to enable Ethiopia to reach its green objectives. In 2016, the Ministry of Finance and Economic Development and UNDP developed a draft Monitoring and Evaluation System Manual for the facility.





Strategic Environmental Assessments are carried out to ensure that public policies, plans and programmes implemented in Ethiopia give due consideration to environmental, socioeconomic, and health and well-being concerns. UNDP developed the assessments together with Ethiopia's Ministry of Environment, Forest and Climate Change. The assessments look at development plans and consider sustainability principles, check for compliance with international environmental standards, and identify the potential environmental and socio-economic impacts (and the mitigation measures needed to reduce such impacts). In a related area of UNDP support, climate-risk governance aims to ensure that key ministries are able to integrate the strategic objectives of the Climate-Resilient Green Economy into their respective development planning and budgeting, a process supported with training carried out by UNDP and the Government.

Forestry, Energy and Economic Growth

Forest resources are critically important for many Ethiopians, especially in rural areas, as they provide firewood for cooking, traditional medicine and construction materials, and help sustain small enterprises in timber production and agroforestry. However, use of forest resources is increasingly unsustainable. More than 80 percent of Ethiopia's energy comes from firewood and charcoal, which is a key driver of deforestation; moreover, the annual consumption of fuel wood is expected to rise 65 percent by 2030. Forest coverage has decreased by 50 percent in the last three decades.

Under its large portfolio of support to the Government of Ethiopia, UNDP is helping prepare the country to take part in REDD+ by supporting projects to reduce greenhouse gas emissions by reversing forest loss and degradation, and by removing carbon from the atmosphere through the conservation, management and expansion of forests. The aim is to build the capacity of government authorities to drive and coordinate the readiness process, to design and implement a transformational model at national and decentralized levels, and to learn from successful experiences from other countries.

National forests generated economic benefits equal to $16.7 billion or nearly 13 percent of Ethiopia's GDP in 2012–13, according to results of a national study released in 2016. The study, *Contribution of Forests to National Income*, was developed by the Ministry of Environment, Forest and Climate Change in collaboration with UNDP, FAO and UNEP. For the first time, it assessed the full contribution of the country's forests to market and non-market income. With a more complete understanding of the sector's full contribution to the economy, Ethiopia is in a better position to implement forest conservation efforts and target its actions to simultaneously reduce emissions, reduce forest degradation and increase economic activity.

In addition to policy and research, UNDP supports forest conservation and management in three regional states: Tigray Region; Amhara Region; and Southern Nations, Nationalities and Peoples' Region. The goal is to rehabilitate 150,000 hectares of degraded highlands and 10,000 hectares of plantation forests over two years. Also, afforestation and rehabilitation activities have been piloted in nine districts, where over 8 million seedlings have been prepared in nurseries. There are now more than 3,000 hectares of new plantations and more than 75,000 hectares covered by rehabilitation sites. This progress builds on an extensive consultative process with communities, civil society organizations and government authorities, with partners working to prepare action programmes, demarcate plantation sites and secure the necessary land. Feasibility studies proposed geographically differentiated technologies and appropriate tree species based on the particular characteristics of local climate, topography, soil structure and other conditions.

In addition, UNDP continues to support the development of a 10-year National Forest Sector Development Programme (NFSDP) that will serve as a road map for the conservation and development of the forestry sector over the coming decade. Successful implementation of NFSDP would result in achieving Ethiopia's medium- and long-term objectives, including increasing the forest cover from its current 15.7 percent to 20 percent by 2020.

Finally, complimenting the work in and around forestry, UNDP supports the National Clean Cook Stoves Programme, which promotes the adoption of improved fuel-wood cook stoves as a simple solution to reduce the country's greenhouse gas emissions. As of 2017, more than 8.5 million households in Ethiopia use these improved devices.

Early Warning for Natural Hazards

Efforts to advance Ethiopia's green economy, reduce carbon emissions and expand both forest cover and energy access are priorities; so too is support to communities most at risk of natural hazards. Early warning systems are being put in place throughout the country, with an emphasis on drought-prone rural areas, to help prevent or prepare for disasters and encourage climate change adaptation.

Frequent droughts affect the country, and the lack of adequate early warning contributes to the severity of impact on people's food security, health and welfare. Other factors contributing to this situation are weak institutional capacity, insufficient observational infrastructure such as automatic weather stations and hydrology gauging stations, and low capacity to analyse and model climate and environmental data. In other words, the country is challenged by its limited ability to foresee, manage and mitigate the impact of disasters and put in place climate adaptation measures. UNDP is helping to fill some of these gaps, working alongside national and local authorities to bring the needed infrastructure and to build the capacity of key actors for weather and climate observation, analysis, forecasting and dissemination of information and warnings.

To date, 41 Automatic Weather Stations have been installed, in line with the country's master plan. Transmitting every 15 minutes, these stations have increased the capacity of Ethiopia's National Meteorological Agency to monitor weather on a real-time basis by 39 percent. This enables short-term early warning on flash floods, hail storms and thunderstorms. Of 200 conventional meteorological stations, 75 percent have been fully calibrated using mobile meteorological calibration equipment. The calibration has significantly improved the accuracy and timely transmission of weather data from the stations. In addition, 95 percent of technicians and middle managers at the National Meteorological Agency have been trained in meteorological data interpretation, forecasting, application and communication.

The expansion of meteorological and hydrological stations has significantly increased the country's coverage and capacity for monitoring extreme weather events. Government authorities use climate and hydro-meteorological information for hydropower generation schemes and irrigation projects and to monitor water dams. For farmers, access to this enhanced weather information allows them to plan their farming calendar, select appropriate climate-resilient crops, determine the best timing for sowing or harvesting, and monitor the availability and condition of pastures and water.

UNDP's work on climate change, disaster risk reduction, energy and forests is helping to reduce poverty and protect lives and livelihoods in spite of the threats posed by climate change and natural hazards. By increasing the country's coverage and capacity for monitoring drought, floods and other extreme events, UNDP is supporting Ethiopia to meet the priorities of the Sendai Framework. UNDP is also helping the Government to achieve its Nationally Determined Contribution to the Paris Agreement, specifically its objective to limit the country's net greenhouse gas emissions by 2030, and to increase the resilience of livelihoods and landscapes in relation to drought and floods by 2020 and beyond.

PROJECT INFORMATION

Project title: Climate-Resilient Green Economy Programme
Project period: 2012–2019
Implementing partners: Ministry of Finance and Economic Cooperation; Ministry of Agriculture and Natural Resources; Ministry of Water, Irrigation and Electricity; Ministry of Industry; Ministry of Environment, Forest and Climate Change; Ministry of Transport; Ministry of Urban Development and Housing
Funding partner: UNDP Core Resource
Total project investment: $5.1 million

Project title: Institutional Strengthening for Forest Sector Development
Project period: 2015–2019
Implementing partners: Ministry of Environment, Forest and Climate Change
Funding partner: Norway, Sweden (Sida), Government of Ethiopia
Total project investment: $15.1 million

Project title: Supporting the Government of Ethiopia in Navigating REDD+ Readiness
Project period: 2014–2016
Implementing partners: Ministry of Environment, Forest and Climate Change
Funding partner: UN–REDD, UNEP, Government of Ethiopia
Total project investment: $545,000

Project title: Strengthening Climate Information and Early Warning Systems for Climate-Resilient Development
Project period: 2013–2017
Implementing partner: National Meteorological Agency; National Disaster Risk Management Commission; Ministry of Water, Irrigation and Electricity
Funding partner: Global Environment Facility
Total project investment: $4.5 million

MALAWI

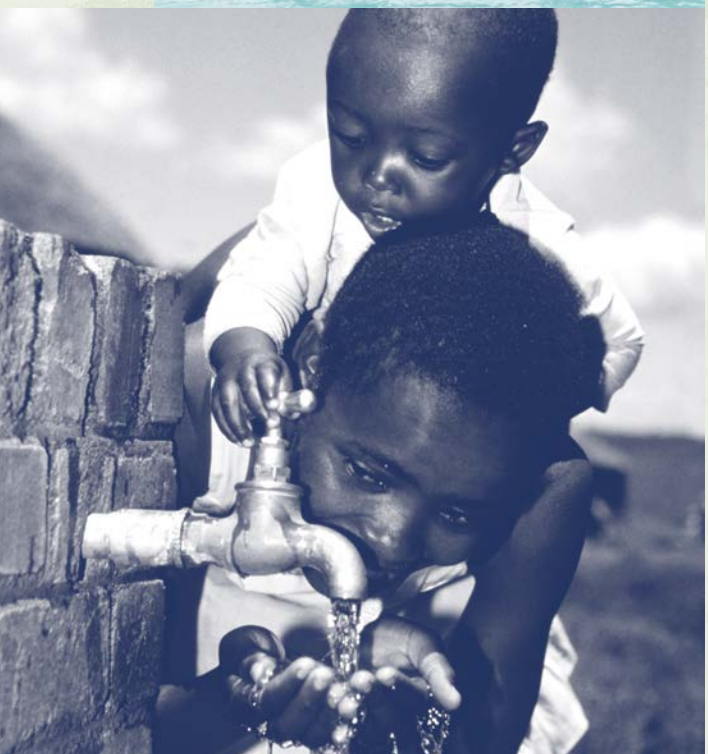
1.1 million
people affected by 2015 floods

250,000
hectares of crops destroyed by 2015-16 drought

85%
population depends on agriculture

9%
population with electricity access

In recent years, Malawi has been experiencing more frequent and intense floods, droughts, strong winds and other extreme weather. Livelihoods in Malawi are heavily dependent on agriculture, which is under significant threat. Long-term projections indicate temperatures will rise and rainfall will significantly decrease, which will in turn undercut hydropower, on which almost all of Malawi's electricity depends. UNDP and the Government of Malawi are thus taking steps to build resilience to disaster and climate risks while also working on long-term climate adaptation and energy production.



Recovering from Severe Floods and Drought

Floods affected more than 1.1 million people and displaced close to 350,000 in 15 of Malawi's 28 districts in 2015. The damage, losses and recovery costs of the floods are estimated at $829 million. Meanwhile, a drought struck the country over the 2015–2016 agricultural season, destroying nearly 250,000 hectares of crops and leaving the country short of food, including maize, Malawi's main staple. A state of emergency was declared in April 2016, when an estimated 6.5 million people were left food insecure. The cost of the drought is estimated at $366 million.

In the immediate aftermath, the Government of Malawi conducted post-disaster needs assessments (PDNAs) with support from UNDP and partners, in particular the European Union and World Bank. The PDNAs yielded results that were used to develop a national recovery framework, with priority actions across sectors and levels of government needed to enable recovery. They also helped inform the national resilience strategy and mobilize resources to address the food crisis and implement recovery interventions.

Recovery efforts supported by UNDP helped to establish new Regional Emergency Operation Centres for the most flood-prone districts; rehabilitate dykes and meteorological stations that were damaged; and protect riverbanks and slopes from further erosion through reforestation and other sustainable land management techniques. In addition, UNDP took immediate action to support the recovery of livelihoods among the communities hit hardest by the floods in southern Malawi, introducing cash-for-work schemes and providing start-up grants to farmers to develop small agri-businesses or other income-generating activities.

To complement this, UNDP also launched a Small Grant Scheme in 15 disaster-prone districts as part of wider cooperation on disaster risk reduction between the Governments of China and Malawi. Grants were approved for community-based organizations and civil protection committees to build flood-protective dykes and to establish evacuation centres.

Adapting to a Changing Climate

Agriculture is essential to Malawi, accounting for 27 percent of GDP and providing livelihood support to an estimated 85 percent of the country's 14 million people. Yet, in the past four decades the country has experienced eight major droughts, and long-term projections indicate that temperatures will continue to rise, while rainfall and water availability will decrease. Given this scenario, UNDP's work has focused not only on recovery but on working with communities to build their adaptive capacity and strengthen resilience.

District-level development plans are integrating climate change adaptation measures. This ensures that local development investments are climate sensitive. Thus far, 18 districts have put in place development policies that address the challenges that climate change presents. Complementing this has been work with district government bodies and local organizations to develop Community Based Adaptation and Community Managed Disaster Reduction plans, which focus on making rural livelihoods more resilient.

Projects in three pilot districts are promoting the adoption of climate-resilient agricultural and livelihood practices. This includes harvesting rainwater that can be stored and used in times of water scarcity; planting trees to support reforestation; diversifying the crops grown by local farmers to reduce their dependence on single crops vulnerable to drought or floods; and building modern maize storage granaries to minimize post-harvest crop losses. An estimated 5,800 people are receiving direct support from these projects, and 600,000 people are benefitting indirectly. The goal is to introduce and then demonstrate the institutional framework required to mainstream adaptation into development planning at local levels, with a vision on scaling up across the country.

Improving Climate Information and Early Warning Systems

Information and early warning systems related to climate change are priorities in Malawi's National Adaptation Programme of Action and UNDP is supporting efforts to strengthen capacities towards this end. This will allow the country to improve its capacity to monitor weather systems and generate information that can be used for planning appropriate adaptation and disaster preparedness actions. This also allows government bodies to generate reliable hydro-meteorological information and to effectively communicate forecasts and warnings.

Equipment to enable a well-functioning meteorological network has been provided with UNDP support. This includes standard rain gauges, thermometers, cup anemometers, evaporation pans, hygrographs, sunshine recorders and computer equipment distributed to the 21 principal meteorological stations in the country. In addition, existing technical systems are being updated and technicians are being trained in how to operate and maintain equipment. In 2016, the project installed 10 automatic weather stations and five automatic hydrological monitoring stations, rehabilitated conventional meteorological equipment in the 21 stations, and built five hydrological data collection platforms.

To ensure that messages reach at-risk populations, the project has installed single side band radios at the Department of Climate Change and Meteorological Services, and connected district climate information centres to community radios in critical districts. A new partnership with telecommunication companies is being forged to enable the use of text messages to communicate warnings on weather conditions to farmers. Some 280 members of Village Disaster Risk Committees are receiving SMS updates that can then be disseminated to the communities they represent. Over 5.2 million people in 11 vulnerable districts will eventually benefit from this project.

Climate Change Policy, Investment and Agricultural Mainstreaming

For Malawi to meet its commitments under the Paris Agreement, development of a national policy and institutional environment conducive to climate change adaptation and mitigation is a matter of priority. UNDP has been assisting Malawi as it has taken steps in this direction and provided support to carry out a detailed study investigating how national policies and strategies address climate change. The study's findings show that climate change falls mainly under general environmental management frameworks and strategies, which provide neither adequate incentives for action nor the necessary enforcement tools.

Following this study, the focus shifted to developing a climate-specific policy and institutional framework. Through a consultative process and in partnership with the Ministry of Environment, Energy and Mines and other relevant ministries, UNDP helped to design Malawi's first National Climate Change Policy and National Climate Change Response Framework. These key instruments now clearly define what should be done in the country to achieve responsive climate change management, highlighting the priority areas where climate change interventions must focus and defining the pathway for management of extreme weather events. In addition, a Climate Change Investment Plan has been established as a mechanism for funding climate change priority areas set by the Government. Helping Malawi to secure the financial resources it needs is critical to success.

This work has enhanced efforts to mainstream climate change into the National Agriculture Policy 2016-2020, with UNDP support to the Ministry of Agriculture, Irrigation and Water Development. This key policy document now recognizes climate change impacts on the sector and promotes investments in climate-smart agriculture and sustainable land and water management.

Ultimately, with its new National Climate Change Policy, National Climate Change Response Framework and Climate Change Investment Plan, Malawi is in a stronger position to meet its climate commitments. In particular, these instruments form the basis for defining what the country will contribute to the Paris Agreement through its own national commitments.

Supporting Sustainable Energy Policy and Programming

Malawi is one of the least-electrified countries in the world with only 9 percent national coverage and less than 1 percent in rural areas. Electricity is generated almost entirely through hydropower, but its capacity has remained stagnant for many years leading to a growing national shortfall as needs have increased. In addition, frequent drought significantly reduces the water levels needed for power generation. Biomass accounts for about 90 percent of the country's energy supply, mainly the use of firewood for cooking, but the unsustainable way in which this is harvested is rapidly clearing the country's forests, in turn contributing to soil erosion and increased flooding.

A new Energy Policy will help Malawi tackle these energy challenges and protect vital ecosystems and carbon sinks. UNDP has been working in partnership with the Ministry of Energy, the private sector and donors to review and update of the country's Energy Policy. Unlike the previous version, the new 2016 Energy Policy includes all fuel resources that can be harnessed sustainably for energy use, providing guidance for implementing both grid and off-grid sources, such as hydro, wind and solar power at household, commercial and industrial levels. It also makes provision for strategies and action plans for renewable energy and energy efficiency, which should over time enable the operationalization of the policy across energy subsectors, including with the participation of the private sector.

In parallel to this policy work, pilot projects implemented in 2016 focus on innovative technologies for renewable energy and energy efficiency in 11 districts. This includes the installation of solar systems in primary schools and the installation of domestic biogas cooking systems.

Sustainable micro-hydro mini-grids are the focus of a project promoting clean and affordable decentralized energy services. Initiated in 2015 with support from the Global Environment Facility, the project aims to expand the reach and generation capacity of Malawi's mini-grid system, benefiting those who would not be able to connect to the national grid in the foreseeable future. To date, the project has connected 327 households to an existing 80kW micro-hydro mini-grid scheme. Work is also ongoing with two additional companies to construct a new 100kW micro-hydro system, along with a 45kW solar powered mini-grid to connect 100 households, and a 100kW micro-hydro system connecting 500 households, two schools, a health clinic and coffee processing plants.

Next steps include the formulation of a national strategy specifically on renewable energy, mainstreaming innovative renewable energy and energy efficiency considerations into development plans at national and district levels, and scaling-up projects in innovative technologies across the most vulnerable districts.

PROJECT INFORMATION

Project title: Recovering from Floods in Malawi: Support to the 2015 PDNA Implementation
Project period: 2015–2017
Implementing partners: Government of Malawi
Funding partner: UNDP
Total project investment: $1,000,000

Project title: Implementing Urgent Adaptation Priorities through Strengthened Decentralized and National Development Plans (ADAPT PLAN)
Project period: 2014–2019
Implementing partners: Ministry of Development Planning and Cooperation
Funding partner: GEF, UK Department for International Development (DFID) and Government of Malawi
Total project investment: $14,894,907

Project title: Support to National Climate Change Programme
Project period: 2013–2016
Implementing partners: Ministry of Natural Resources Energy and Mining
Funding partner: Government of Japan, Government of the Netherlands, GEF Least Developed Countries Fund and United Nations Institute for Training and Research
Total project investment: $14,850,000

Project title: Sustainable Energy Management Support to Malawi
Project period: 2012–2016
Implementing partner: Department of Energy Affairs
Total project investment: $7,325,000

RWANDA

Rwanda is a highly mountainous country where agriculture sustains an estimated 90 percent of the population and the forest sector provides 90 percent of the energy consumed. It is susceptible to drought, floods, landslides, earthquakes and volcanic eruptions. Temperatures in the country have increased on average by 1.4°C since 1970, higher than the global average. Projections warn that average annual rainfall may increase up to 20 percent by the 2050s, also increasing in rainfall intensity. With a population of nearly 12 million, the country is highly dependent on natural resources and ecosystem services, yet unsustainable resource use is causing deforestation and increasing Rwanda's vulnerability to climate change and disaster impacts. The growing demand for forest products outweighs the limited national supply, while demographic pressure leads to an over-exploitation of land that is already limited.

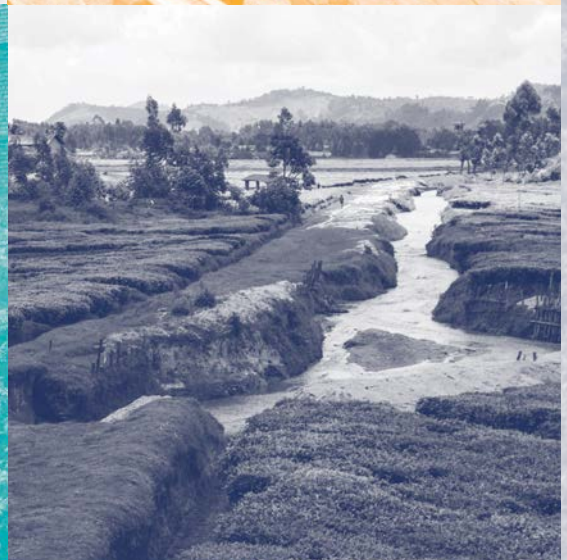
The Government of Rwanda is working with partners to implement both climate adaptation and mitigation efforts. This includes model 'green villages' and support to develop Nationally Appropriate Mitigation Actions. At the same time, work is underway to scale up renewable energy, protect forests, and strengthen capacities for disaster risk reduction and recovery.

90% depend on agriculture

29% of territory covered by forests (unevenly)

23% increase in household energy access 2015-2016

90% energy consumed provided by forest sector



Planning for Rwanda's Development

Rwanda's limited resource base is stressed by population density, poverty and high dependence on natural resources for agriculture and food, fuel, medicines and other needs. At the same time, degradation of land, water, forests and ecosystems is increasing its vulnerability to climate change and hindering human development. The Government of Rwanda is placing natural resource management and climate resilience at the centre of its development process with support from UNDP. In partnership with the Rwanda Environmental Management Authority and UNEP, UNDP focuses on capacity development to support the integration of environmental considerations, natural resources management, and climate change mitigation and adaptation measures into national policies, plans and budgets.

Demonstration 'Green Villages' Across the Country

Ongoing technical and financial support is helping to replicate 'Green Villages' in Rwanda, a concept introduced by the Rwanda Environment Management Authority in 2011 that offers multiple social and economic benefits. In these planned villages, residents are connected to the electricity grid and no longer use firewood for cooking (thereby protecting their forest resources). They also benefit from improved water resources for drinking and farm irrigation, and have better crop production and food security. In one village, for example, the project installed a water-harvesting system with a capacity of 250 cubic metres and a waste treatment system that produces biogas energy, which in turn can be used for cooking and to fertilize farms to increase yields. Houses have been built to accommodate 152 poor vulnerable families that had to be relocated from a previous settlement that was at risk of disasters.

There are plans to expand the innovative approach of Green Villages to all 30 districts in the country, a goal now mandated by the Government through its Integrated Development Programme; work is already underway in nine. UNDP has been supporting a training programme to facilitate this expansion, using a dedicated Green Village toolkit to train district officials and communities on the principles of sustainable climate-resilient development.

Several Initiatives Contribute to the Green Villages Concept

In 2016, Rwanda's Fund for Natural Resources, Environment and Climate Change provided resources for 13 projects. Also in 2016, the Fund provided $700,000 to implement green district development plans in all 30 districts. The Rwanda Environment Management Authority develops projects for the Fund, which is supported by several donors, with assistance from UNDP. UNDP has also supported the preparation of a proposal for funding from the Global Environmental Fund for a project, Climate Proofing Green Villages, which will bring $9 million in fresh funding.

Initiatives to increase the amount of land with rehabilitated ecosystems and forest cover also contribute to the Green Villages. In 2016, a UNDP-supported project added 8,157 hectares of forests and 2,303 hectares of rehabilitated ecosystems. Another initiative is increasing the number of households with access to electricity. In 2016, nearly 90,000 additional households were connected to on-grid electricity and more than 37,000 more households were connected to the off-grid network. Overall, access to energy increased from 508,000 households in 2015 to 627,214 in 2016 for a 23 percent increase.

Restoring the Forest Landscape in the Mayaga Region

Forest covers almost 29 percent of Rwanda's territory but is unevenly distributed, with most forests found in the western part of the country. In the Southern Province, the Mayaga region has patches of indigenous forests that are home to significant plant biodiversity and carbon stocks and also provide watershed services to the agricultural landscapes nearby. However, ecosystem degradation in the region has been increasing over the past decade, leading to biodiversity loss and a sharp decline in ecosystem variety and integrity. Many areas suffer from deforestation and forest degradation, resulting in a loss of carbon stocks, largely driven by the over-use of wood for fuel.

In four districts of the Mayaga region (Gisagara, Kamonyi, Nyanza and Ruhango), UNDP is working in partnership with the Rwanda Environmental Management Authority to restore the ecological function and biological productivity of deforested landscapes, aiming to enhance carbon benefits and forest biodiversity conservation. These efforts will simultaneously strengthen the resilience of agricultural production and livelihoods by promoting the use of clean energy technologies and restoring local forest landscapes.

One of the goals is to increase by 10 percent the number of households in the four districts that use climate-smart renewable energy technologies, such as energy -efficient cook stoves and lighting systems. This will be achieved by raising awareness, influencing behaviour change among communities and improving community access to these technologies. When fully implemented, this project should reduce by 30 percent the demand for firewood from local households, helping to slow deforestation and reduce greenhouse gas emission.

Several projects focus on trees. Some 10,000 hectares of new plantation forests have been planted in the districts, often with fast-growing species to accelerate the increase of forest cover. The plan is to restore an additional 40,000 hectares of forest landscapes. These plantations and forests are needed in Rwanda to increase the supply of wood and reduce pressure on the country's limited forest resources. Farmers will also benefit from support to grow tree-based cash crops, such as coffee and cassava, to adopt climate-smart crop production techniques, and to plant trees and establish tree nurseries on farms and in designated areas. Alternative economic activities will be introduced to diversify the livelihoods of local populations, based on sustainable wood harvesting practices as well as on non-wood forest products.

National Efforts to Incentivize Green Business and Strengthen Policy

In parallel, UNDP will work with the Government to develop a system of incentives to engage the private sector in green businesses. A combination of incentives will be used, such as removing existing barriers to private sector participation, introducing government subsidies, and providing loans and grants to local cooperatives. These market incentives will promote the scaling-up of private sector renewable energy technologies such as biogas and solar power, thereby increasing their supply and availability on the market. Additional benefits include an increase in clean energy businesses and improved local economic development.

UNDP will also support the Government of Rwanda to develop its Nationally Appropriate Mitigation Action 2016–2030. Among other objectives, this will provide an effective policy and institutional enabling environment for sustainable charcoal production in the country. The successful implementation of mitigation actions between 2016 and 2030 is expected to reduce the country's net greenhouse gas emissions by approximately 5.5 million tonnes of carbon dioxide equivalent (tCO2e) based on the carbon sequestration potential from avoided deforestation.

These initiatives are helping Rwanda to shift from a thoroughly unsustainable development model to one that is dominated by green growth and resilience, helping the country to maintain low greenhouse gas emissions, increase its forest cover and transition towards clean energy.

Working with MIDIMAR to Map Risk and Prepare for Recovery

Rwanda has significant exposure to a variety of natural hazards. In 2002, the volcanic eruption of Mount Nyiragongo displaced about 400,000 people. In 2015, districts in the Western Province experienced flooding and landslides. In 2016, the Eastern Province, one of the most populous provinces, experienced drought. UNDP is working in partnership with Rwanda's Ministry of Disaster Management and Refugee Affairs (MIDIMAR) to help increase national and local capacities in disaster response, risk reduction and recovery. The initiative supports the country to reach its national vision of building a "disaster-resilient nation".

The first comprehensive National Risk Atlas in Africa was produced by MIDIMAR in 2015. It provides detailed maps showing disaster-prone areas and the estimated population affected by floods, landslides, droughts, earthquakes and heavy storms. The Atlas provides information that policy makers can use to make Rwanda's development and investment more risk-informed, resilient and sustainable.

In 2016, hazard and risk-mapping exercises were conducted in communities in the Ngororero district. Communities and local authorities identified potential hazards such as floods and landslides and identified areas prone to erosion, public infrastructure and assets (e.g. crops and equipment) most exposed to these hazards.

Training for district authorities on disaster risk management and preparedness has continued with UNDP support. In 2016, local authorities in nine districts received training by MIDIMAR about how to conduct post-disaster needs assessments. Representatives from various ministries and other district authorities participated in the trainings. A National Disaster Recovery Strategy has been developed, clarifying roles and responsibilities and detailing key actions, approaches, mechanisms and systems for effective and efficient disaster recovery.

Sixteen disaster-resilient model homes have been built to demonstrate the housing construction guidelines developed by MIDIMAR with UNDP support. Villagers have received practical training on resilient building techniques and use of local resources (e.g. volcanic rocks and artisanal bricks), while districts are ensuring access to individual plots of land and basic social services including schools, health facilities and water and sanitation.

In Gakenke District in 2016, another project implemented with MIDIMAR helped communities affected by floods and landslides. A total of 18 community bridges were repaired and rehabilitated. As part of recovery programming, 37 Community Savings and Loan groups made up of 748 vulnerable displaced families and female-headed households received start-up cash grants to help them re-start local microenterprises. Another 27 groups will be receiving grants. Meanwhile, local cash-for-work schemes have protected and restored nearly 200 hectares of Kagoma marshland, rehabilitated 33 kilometres of roads damaged by the disaster, and led to the planting of 13,000 trees — benefitting in total more than seven million affected people in Gakenke.

PROJECT INFORMATION

Project title: Poverty & Environment Initiative Rwanda Programme
Project period: 2014–2018
Implementing partners: Rwanda Environment Management Authority
Funding partner: UNEP and UNDP
Total project investment: $5 million

Project title: Forest Landscape Restoration in the Mayaga region
Project period: 2016–2022
Implementing partners: Rwanda Environmental Management Authority
Funding partner: Global Environment Facility
Total project investment: $25.8 million

Project title: Building National and Local Capacities for Disaster Risk Management
Project period: 2013–2018
Implementing partners: Ministry of Disaster Management and Refugee Affairs
Funding partner: World Bank, Global Facility for Disaster Reduction and Recovery (GFDRR), African Development Bank Group (AfDB)
Total project investment: $8.8 million

ASIA

CAMBODIA

Cambodia is highly vulnerable to climate change due to floods and drought, heavy reliance on agriculture and the large number of people residing in low lying areas. Its capacity to cope with disaster events is weak and its rate of deforestation is third highest in the world. At the national level, efforts are underway to put in place the policies and institutional systems needed to address challenges in climate change, energy access and natural disasters. At the local level, programmes strengthen community-based adaptation; expand the use of renewable energy sources and energy access; provide faster early warning to communities in the event of a disaster; and help to avoid the loss of forests that provide protection and act as natural carbon sinks. These UNDP-supported initiatives are helping Cambodia make progress towards the Sustainable Development Goals (SDGs) as well the Paris Agreement and Sendai Framework.

10% forest cover drop from 2010-14

50% of provinces affected by flash floods in 2012

50% of provinces affected by drought in 2013

27% emissions pledged as part of its iNDC

Advancing Cambodia's Climate Action Agenda

Climate change adaptation and disaster risk reduction are significant concerns for the Government given the country's high vulnerability combined with low adaptive capacity, as well as the dependence of its economy on climate-sensitive sectors such as agriculture and tourism. One of the fundamental building blocks for strengthening the national capacity has been the creation of an enabling environment through initiatives that have put in place or strengthened institutional, policy, legal and procedural systems to ensure climate action. UNDP has worked with the National Climate Change Committee to engage a broad range of national and local stakeholders, and promoted partnerships between government ministries, civil society organizations, academia and the private sector. This helped facilitate the national process for the adoption of a law that ratifies the Paris Agreement.

A key achievement is the establishment of the National Council for Sustainable Development and its seven technical working groups. These government bodies will be responsible for moving forward the climate agenda in Cambodia to achieve sustainable development in key areas prioritized by the Government, such as energy, sustainable cities, biodiversity and biosafety. They will steer the process for implementing the country's policy and regulatory frameworks as well as the research, training, technological innovations and exchanges needed to implement the Paris Agreement.

With concerns spanning every sector, UNDP provides technical and grant support to sector ministries to design and implement Climate Change Action Plans for their respective sectors. For example, each ministry receives advice to improve the planning and budgeting process to better integrate climate change into development planning and programming. UNDP supports the cost-benefit analysis of programmes in the context of climate change and provides concrete recommendations to integrate climate-change related measures in budgets. As of 2017, sectoral ministries have developed a total of 14 Sectoral Climate Change Action Plans through this initiative.

At the provincial level, UNDP works with Provincial Departments in three provinces on the integration of climate change into development plans and their budgets. The integration is based on a careful and contextual analysis of climate change issues facing each of the provinces and communes, and designed so as to complement and strengthen existing and intended long-term development objectives.

Climate finance is another challenge, and UNDP works with the Government to help projects secure grants from a dedicated grant facility. This facility has allowed Cambodia to successfully test potentially beneficial adaptation technologies such as the use of biomass as a source of energy for the garment industry and the use of medium-sized bio-digester plants in the agriculture sector.

Community-Level Action in Climate Adaptation and Renewable Energy

In addition to support at the national and sectoral levels, UNDP also works with communities on the ground. The Cambodia Community Based Adaptation Programme (CCBAP) reduces the vulnerability of Cambodia's agricultural sector, specifically in water availability. The project also supports efforts to enhance the capacity of vulnerable communities to build resilience and mainstream climate change into local development planning. Through this initiative, vulnerability assessments were carried out to determine and address gaps. As of 2014-2015, rehabilitation initiatives had improved water access in 11 canals, two reservoirs, three community ponds, 29 family ponds and 25 water wells. At the same time, project support established six seed banks to support rice production in at-risk areas and created 52 "savings groups" to enable communities to identify and fund their own measures and livelihood programmes.

CCBAP also works on the mitigation side to help the country achieve its ambitious plans of ensuring electrical access for 70 percent of all households by 2030. Through the project the Government of Cambodia is installing solar panels for rural communities. In two rural villages, solar panels convert sunlight into electrical energy and store this in batteries that can be used in lieu of noisy and polluting diesel generators. At least 24 panels of 135W each have been installed and can produce about 22.5kW per day, helping to charge 50 batteries daily.

Fishing is the focus of another local effort, the Cambodia Climate Change Alliance Project, through which UNDP supports creation of local climate-resilient livelihoods. In one example, a local man converted his 7,000-square metre backyard into a fish-raising facility, replete with a concrete filtration tank. Here, ground water is stored and filtered through layers of rock and sand and used to hatch and nurse fingerlings before they are big enough to be released into 12 farm ponds that together hold about three tonnes of carp, tilapia and African catfish. Sales from the fish average $150 per month.

Reducing Deforestation and Forest Degradation: the National REDD+ Strategy

Loss of forest cover in Cambodia is dramatic, with the country's total forest cover dropping from 57 percent in 2010 to 47 percent in 2014. There were 10.1 million ha of forest in 2010 and only 8.5 million ha in 2014. Diminished forest cover and the compromised condition of forests not only risks the loss of biodiversity and environmental integrity, but also threatens to exacerbate disaster events such as floods and landslides and diminishes the natural ability to absorb carbon emissions. The Government endorsed REDD+ in 2010 as a national strategy to tackle the alarming rates of deforestation and forest degradation in the country, and to improve the livelihoods of forest-dependent communities. UNDP has been assisting the Government to address these concerns, particularly since 2013 through the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) and Forest Carbon Partnership Facility (FCPF) Project.

In 2016, the FCPF project supported the development of the final National REDD+ Strategy (2017-2026) and facilitated an extensive consultation process, including the organization of a National Consultation Workshop. The consultation process involved 300 representatives from government ministries, development partners, non-governmental organizations, and representatives of local communities, indigenous people and women's organizations. Overall, over 15 national consultations took place and more than 1,000 partners consulted in the process of developing the National REDD+ Strategy. The strategy contributes to national and global climate change mitigation with three objectives: (1) improve the use, management and monitoring of forest resources; (2) implement actions that contribute to sustainable forest management; (3) build the participation and the capacities of stakeholders to implement the National REDD+ Strategy. Actions within the strategy include forest governance responsibilities, new environmental codes, consolidation of conservation areas and creation of 6 million ha of protected areas in the country.

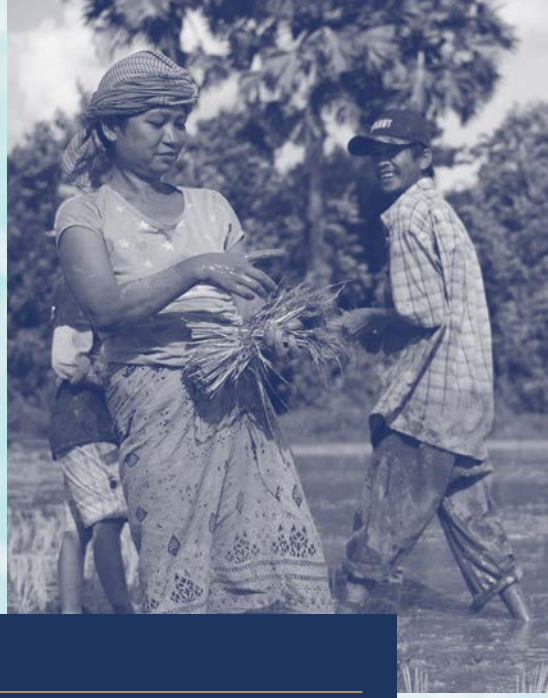
In support of the National REDD+ Strategy, the FCPF project worked with Cambodia in 2016 to develop an initial National Forest Monitoring System, including a database and data-sharing mechanism across relevant institutions and the design of a national forest inventory. FCPF also helped establish Forest Reference Levels to serve as benchmarks for assessing the country's performance and progress. This included quantifying the drivers of CO2 emissions, identifying models of community-based forest management and developing case studies for scaling-up good practices. FCPF also supported the establishment of five demonstration sites at the subnational level to test and measure potentially effective mechanisms that could inform design approaches or help build the capacity of local authorities to implement mitigation actions.

The next steps will be to support the Government to develop and implement an action plan for the new National REDD+ Strategy and to mobilize financial resources to achieve its national target of maintaining 60 percent forest cover. These measures will contribute to reducing emissions in line with the Paris Agreement.

Effective Early Warning for Disaster Risk Reduction

Eighty percent of Cambodia's population lives in rural areas and subsistence farming is the main livelihood for the majority. Climate-related events such as floods, storms and longer and more intense dry seasons can have devastating impacts and threaten Cambodia's progress towards the SDGs. Damage to infrastructure, for example, affects the ability to meet SDG 3 on childhood education, while flooding and inundation can destroy crops and impact SDG 2 on food security.

Early warning systems are the focus of a four-year initiative to enable timely response to natural hazards and extreme weather events, as well as risk-inform development planning. UNDP and partners launched the initiative with the financial support from the Global Environment Facility (GEF) Least Developed Countries Fund (LDCF). The project will help generate and effectively disseminate early warning messages that enable faster disaster response. A particular emphasis is on building the institutional capacity (at national and local levels) to benefit those most vulnerable to climate-related disasters, namely rural farmers and their families.



Taken together, the various projects and initiatives underway in Cambodia, led by the Government with support from UNDP and partners, paint a picture of a country that is pushing forward on the resilience-agenda. Stronger national policies and institutional systems, community-based adaptation, energy access, early warning systems and protection of forests are some of the many efforts taking place. These efforts are helping Cambodia make progress towards the Paris Agreement, particularly through adaptation and forest strategies, and the Sendai Framework, notably on better early warning and preparedness for disaster risk reduction.

Project Information

Project title: Cambodia Climate Change Alliance Phase 2
Project period: 2014–2019
Implementing partners: Ministry of Environment
Funding partner: European Union and Swedish International Development Cooperation Agency (Sida)
Total project investment: $13,397,600

Project title: Forest Carbon Partnership Facility REDD+ Readiness Project
Project period: 2013–2017
Implementing partners: Cambodia Forestry Administration
Funding partner: Forest Carbon Partnership Facility Grant (World Bank)
Total project investment: $3,800,000

Project title: Cambodia Community Based Adaptation Programme
Project period: December 2010 to September 2015
Implementing partners: Local NGO & Community Based Organizations
Funding partner: Government of Australia (Australia Aid) and Government of Sweden
Total project investment: $4,504,640

Project title: Strengthening the Governance of Climate Change Finance to benefit the poor and vulnerable
Project period: 2012–2016
Implementing partners: Ministry of Environment
Funding partner: Government of Sweden
Total project investment: $2,050,000

Project title: Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change
Project period: 2014–2018
Implementing partners: Ministry of Water Resources and Meteorology
Funding partner: GEF/LDCF
Total project investment: $4,910,285

MALDIVES

80% landmass less than one metre above sea level

+75% critical infrastructure 100 metres from the ocean

28% GDP derived from tourism

10% pledged minimum emission reduction by 2030

A country of 1,199 islands, 202 of which are inhabited, the Maldives faces rising sea level, cyclones, storm surges and flooding. Close to 80 percent of the landmass is less than one metre above sea level and over 75 percent of the country's critical infrastructure is only 100 metres away from the ocean. Nearly 28 percent of the country's GDP derives from tourism. UNDP works with the Government to help strengthen this small nation's resilience to disasters and the changing climate by taking an integrated approach to increasingly interconnected problems. UNDP's support in the Maldives includes a strong resilience component. Through local level adaptation, in particular efforts to ensure fresh water access and strengthen early warning and response capacity, UNDP is working with the Government to protect lives and livelihoods, while making progress in line with the Sendai Framework and Paris Agreement. Similarly, efforts to better manage waste and to expand renewable energies are helping to reduce greenhouse gas emissions and transition the country to a sustainable development path for the long term.

Climate Change Adaptation and Water Management

Water scarcity is a growing problem in a country where the Government is already providing emergency water during dry spells. Surface freshwater is generally lacking in the Maldives because there are no permanent rivers or streams on the islands. People in the rural, outer islands rely on rainwater harvesting for their drinking water, but the supply often lasts eight months or less. Shallow groundwater aquifers provide water for washing, bathing, agriculture and other uses. However, groundwater is becoming more contaminated by saltwater intrusion and flood-induced pollution. Many freshwater aquifers are already stressed from over-extraction and from extended periods of dryness, which are becoming more common. Many households face water shortages during dry periods, making necessary the provision of emergency water by government authorities for months at a time.

To address Maldives' growing water scarcity, an integrated water management project based on principles of climate risk resilience and adaptive capacity was initiated by UNDP and the Government, with support from the Adaptation Fund. The aim was to increase the resilience of ground and freshwater resources on three islands: Mahibadhoo (Alifu Dhaalu Atoll), Ihavandhoo (Haa Alifu Atoll) and Gadhdhoo (Gaaf Dhaal Atoll). As of 2017, the investment has brought safe and uninterrupted drinking water supply to 7,000 inhabitants of these islands through combined sources of harvested and desalinated water.

Building on this success, a more ambitious initiative to deliver safe and secure freshwater to 105,000 people, or 26 percent of the Maldives' population, is being developed by the Ministry of Environment and Energy with support from UNDP. The project, which was approved by the Green Climate Fund in 2015 and will begin implementation in 2017, will build an integrated water supply system on 45 islands that will provide year-round potable water for household consumption supplied through rainwater and groundwater. To provide backup capacity in times of water stress, the project will establish desalination water plants on four islands to serve as production hubs for further distribution to islands in the north, which is the most vulnerable region during the dry season. Also, a groundwater recharge system will be installed for excess rainwater on 49 islands, including greywater recycling on selected islands.

Waste Management and Renewable Energy for the Laamu Atoll

Though the county produces little in the way of greenhouse gases, it is taking steps to reduce carbon emissions and to invest in sustainable development that is low-carbon and climate-resilient, thus contributing to the Paris Agreement. UNDP has been supporting these efforts through better waste management and increased access to renewable energy systems.

Solar panels and LED lights are part of an energy project for Laamu Atoll, which is the country's largest with 12,000 people spread across 11 inhabited islands. UNDP partners with the Government, civil society, the private sector and other agencies on a number of key initiatives. These efforts are reducing Laamu Atoll's dependence on fossil fuels and promoting renewable energy and energy efficiency. As a starting point, the partners conducted an Integrated Energy Resource Assessment of the islands to identify the different types of energy being used and the various energy use patterns of households, schools, government offices and key economic sectors. The results highlighted opportunities that communities and local authorities could adopt. For example, as of 2016, solar panels installed in 11 schools will reduce energy use and meet 30 percent of school energy needs. Similarly, in 2016, existing lights in the harbors of all 11 islands were replaced with energy-efficient LED lights to reduce energy consumption by 50 percent. The next step will be to convert health centres to solar energy. Training on the operation and maintenance of the solar panels was provided for local council staff and employees of the utility company to ensure maintenance is sustained in the future.

Solid waste management is another sustainable solution being introduced in the Laamu Atoll, where local communities say the total absence of a proper waste management system has been a top concern for many years. Waste has been buried, burned or dumped along the coast or near homes, negatively affecting the health of communities, while also contributing to carbon emissions. Today waste management facilities operate in Laamu Maamendhoo and Laamu Hithadhoo, and another is under construction in Laamu Isdhoo, established with the help of a grant. The new facilities enable people to make the change to using segregation, compactors and glass crushers for recyclable waste and composting for perishable waste. Further technology transfer will take place this year to support local waste management. In 2016, solid waste management plans were developed for all of Laamu Atoll as step towards integrating the systems of all 11 islands in line with national solid waste management policies and plans.

Several studies have been conducted to determine the best measures for the islands, including mapping land use and natural resources on the islands; climate-sensitive agricultural data collection; and a water audit to determine the water consumption rate, water demand from various sources, ground water quality and water waste in households. These studies will help to develop appropriate sustainable solutions in natural resource management, agriculture, water and other key sectors to be implemented in the coming years.

One study of particular importance was an assessment carried out to determine the level of vulnerability to climate change that exists in the Laamu Atoll. The results have helped authorities and communities to structure their local development plans accordingly. There is a new Laamu Atoll Development Plan that is climate-smart, and seven individual islands have created similar local development plans that build resilience to climate change. In related training, all island councils in the atoll participated in workshops on climate change impacts and on forecasting possible future climate scenarios. Building resilience to climate change is essential in the exposed island nation, where climate change threatens to exacerbate or intensify disaster events.

Improved Early Warning for 20 Islands

Cyclones, localized floods and storm surges frequently cause destruction, hardship and enormous losses in relation to the size of the country's economy. Dramatic and immediate threats are posed by such disasters. A project to build the preparedness and response capacity of authorities in 20 islands is strengthening resilience against these extreme events, carried out by UNDP with the National Disaster Management Centre of the Maldives. These 20 islands now have standard operating procedures for receiving early warnings and for responding to them. They also have trained disaster response teams with the necessary equipment, such as search-and-rescue kits, flood drainage pumps and firefighting kits. Such procedures and resources make for a stronger level of readiness and community preparedness on the islands.

Substantially stronger early warning systems now operate on four islands, including a crisis monitoring methodology at the island level plus a warning dissemination mechanism with clear instructions for official actions that would be taken in response to the warnings. Currently, the crisis monitoring methodology and instructions for official actions are being dispersed throughout the Maldives. Plans are also underway for the technical warning dissemination systems to be established across an additional 20 islands.

Drone technology is being used to protect vulnerable communities through a public-private partnership with DJI and UNDP. The drones are used to prepare hazard maps of the many islands that constitute the country. By mapping the islands, communities can identify areas where erosion has changed the physical environment, where areas are exposed to sea-surge or storms and where flooding or inundation may occur. The information is shared with local community response teams, ensuring that they are able to identify hazard-prone areas and take necessary precautions before a disaster occurs such as building sea walls or planning evacuation routes. The maps and data are also shared with the Government to promote evidence-based, risk-informed decision making for effective policy.

At the national level, the National Disaster Management Centre (NDMC) of the Maldives has partnered with UNDP to support the Government in enacting and operationalizing Disaster Risk Management (DRM) legislation. The programme of support also includes efforts to strengthen early warning operating procedures, increase public awareness and knowledge on disaster risk reduction and climate change adaptation, and increase community capacity for disaster preparedness. As of 2017, the DRM legislation has been enacted and actions are ongoing across each of the other work streams.

UNDP supported the enactment of the country's legislation on disaster risk management and helped improve the country's capacity to report progress against the Sendai Framework for Disaster Risk Reduction. These initiatives will help guide local level action across the islands and further build resilience to the impacts of climate change and natural hazards.

Project Information

Project title: Support of Vulnerable Communities in Maldives to Manage Climate Change-Induced Water Shortages
Project period: 2016–2021
Implementing partners: Maldives Ministry of Environment and Energy
Funding partner: Green Climate Fund
Total project investment: $28.2 million

Project title: The Integrated Water Resource Management Project (IWRM)
Project period: 2012–2015
Implementing partners: Maldives Ministry of Environment and Energy
Funding partner: Adaptation Fund
Total project investment: $8,285,000

Project title: Low Emission and Climate Resilient Development (LECReD)
Project period: 2013–2017
Implementing partners: Ministry of Environment and Energy, Local Government Authority, Environment Protection Agency, Maldives Land and Survey Authority, Ministry of Housing and Infrastructure
Funding partner: Government of Denmark
Total project investment: first tranche $4.6; second tranche (2016) $1.69 million

Project title: Scaling up the National Capacity for Disaster Risk Reduction and Management in Maldives
Project period: 2015–2017
Implementing partners: Maldives' National Disaster Management Centre
Funding partner: Government of Japan
Total project investment: $380,000

NEPAL

In Nepal's Himalayan region, the total estimated ice reserve between 1977 and 2010 decreased by 29 percent. With climate change, it is likely that the glaciers will continue to shrink under increasing heat, threatening to burst 20 glacial lakes. Energy will be one of the main sectors affected. At present, about 90 percent of the country's electricity comes from hydropower, which will be impacted due to both floods and water scarcity as a result of climate change. This is occuring in a country where one fourth of its 26.5 million people do not have access to electricity. In 2016, UNDP continued to provide ongoing support to help the country to adapt to climate change and strengthen disaster resilience, including initiatives to reduce the risk of large flood outbursts from glacial lakes and to expand the country's renewable energy capacity.

In 2015, Nepal was struck by two near simultaneous earthquakes that killed nearly 9,000 people, destroyed more than half a million homes and affected over 8 million people. UNDP's support to Nepal has therefore included early and long-term recovery efforts.

20
glacial lakes could burst due to climate change

90%
electricity comes from hydropower

800,000
homes destroyed or damaged by 2015 earthquakes

1.5 - 2%
equivalent to annual GDP spent in climate variability / extreme events costs

Build-Back-Better After the 2015 Earthquakes

The 2015 earthquakes destroyed or damaged nearly 800,000 homes and government buildings including schools, water infrastructure and health facilities. Overall damage and losses totalled $7 billion. The massive recovery process required surpassed the capacity of the country and international assistance was critical to support the effort.

Following the earthquakes, UNDP's response included efforts to ensure that national recovery and reconstruction would be undertaken in a manner that helped 'build-back-better'. This included ensuring that infrastructure was stronger and more resilient. Some 2,000 local masons and engineers participated in UNDP-supported training. A mason training course was also institutionalized within a national vocational training institute.

Awareness-raising campaigns helped to reach more remote areas with radio broadcasts promoting safe construction practices and a new UNDP initiative, 'Mobile Video Van', offering demonstrations to guide over 18,000 homeowners on earthquake-safe housing construction.

Two innovative housing designs were introduced by Nepal's Institute of Engineering and with the National Centre for People's Action in Disaster Preparedness of India in collaboration with UNDP. One design technology uses block built from the debris of damaged buildings, thereby decreasing building costs, and the other uses rough building stone set in mortar and contained with wire, which improves safety and reduces the use of timber and water.

Another resource is the *Catalogue for Reconstruction of Earthquake Resistant Houses*, which was produced by the Department of Urban Development and Building Construction with support from UNDP. The publication illustrates 12 alternative materials and technologies with 17 model designs that are cost-efficient and environmentally friendly.

UNDP also provided direct support to communities. Over 12,000 earthquake-affected microenterprises were revived and some 60,000 new jobs created. About 310 essential community buildings were rehabilitated, benefitting 23,000 households. Given that the earthquakes destroyed many public buildings, UNDP built 14 temporary government offices to enable authorities to deliver urgently-needed public services.

These recovery efforts were set on a foundation of years of UNDP support to strengthen the capacity of the Government in disaster risk reduction, for example through technical support to the National Planning Commission to mainstream DRR into the national planning process. Since 2012, UNDP in partnership with the Ministry of Home Affairs has established a network of 56 Emergency Operations Centres in Nepal, to serve as the main coordination hubs for disaster preparedness and response in the country. When the earthquakes strike, the centres facilitate decision-making related to earthquake response needed within the first vital hours. They also function as coordination centres to plan search, rescue and emergency relief operations such as setting up transit shelters and facilitating the entry of humanitarian assistance into the country.

Mitigating Flood Outbursts from the Imja Glacial Lake

As warming continues, downstream communities are at risk of large-scale flooding from Glacial Lake Outburst Floods (GLOFs). Working in partnership with Nepal's Department of Hydrology and Meteorology, UNDP has been helping to holistically reduce these risks, particularly around the Imja Glacial Lake. One strategy has been to lower the water level of the lake, which in turn alleviates the hydrostatic pressure in the moraine dam, thereby reducing its risk of failure and the potential of a GLOF event. Already, the project has succeeded in lowering the water level of the Imja Lake by 3.4 metres, protecting communities living downstream.

New early warning systems are in place around the periphery of the lake, and local task forces have been formed, trained and equipped to ensure their proper use and maintenance. Over 12,000 people residing in the area are now safer with these measures in place, as well as 74,992 tourists, porters and guides who work in the Everest region.

Injecting Renewable Energy into the National Grid

In Nepal, 25 percent of the population lacks access to electricity and in rural areas this increases to 40 percent. The Government of Nepal is committed to accelerating use of renewable energy sources. Policy work in 2016 saw UNDP working alongside Nepal's Ministry of Population and Environment to develop a Renewable Energy Subsidy Policy that introduces subsidies for the first time in the country. It also provides grant support to the private sector for the development of off-grid clean energy projects.

To connect large solar and wind energy plants to the national grid, a government priority, UNDP supported a task force to achieve this goal. Also in 2016, the project worked alongside the Central Renewable Energy Fund to establish financing mechanisms such as soft credit, credit guarantees and credit insurance. Financial assistance was provided in 2016 to install 36 small-scale solar irrigation systems that help farmers to avoid crop losses when rainfall is scarce.

Another idea related to the Renewable Energy Subsidy Policy is to promote small-enterprise development in the renewable energy sector and to assist communities to form cooperatives to operate and manage clean energy schemes. In 2016, 443 enterprises were established using the newly available subsidy that not only promote clean energy but also increase access to electricity and generate income.

Renewable energy projects also support the earthquake recovery process. Through a new government Relief and Rehabilitation Package, more than 120 solar PV systems were installed in public buildings, bringing the benefits of energy services to more than 250,000 people affected by the earthquakes.

Governance for Climate Finance

UNDP is working with the Ministry of Finance as well as other ministries to integrate climate finance into Nepal's core planning and budgeting processes. The emphasis is on the cross-cutting nature of climate change and the need for better coordination among ministries to respond to climate change and disaster risks.

A climate change budget code was established under the leadership of National Planning Commission. Nepal is one of the first countries to do this. Other achievements include creation of a baseline to understand climate-related expenditures through the Climate Public Expenditure and Institutional Reviews, and the institutionalization of reporting on climate-related expenditure. Planning and budgeting formats, together with the planning and budgeting guidelines, are circulated to line ministries to help prepare annual plans and ensure that budgets include climate change dimensions.

UNDP has been assisting the government to create a Climate Change Financing Framework, which is a whole-of-government road map that engages all relevant stakeholders towards the mobilization and use of climate change finance. It includes costing of planned climate change response actions in the medium term and long term, and ensuring accountability in the use of climate change finance to address the needs of the most vulnerable people in Nepal.

Taken together, all of these efforts are producing results for Nepal. The new Renewable Energy Subsidy Policy will help the country to achieve, by 2050, 80 percent electrification through renewable energy sources and to reduce its dependency on fossil fuels by 50 percent, as expressed in its Nationally Determined Contribution (NDC) to the Paris Agreement. Stronger policies and practical measures in climate change adaptation and disaster risk reduction will safeguard development advances and post-earthquake recovery efforts, and help achieve the priorities of the Sendai Framework. Policies and programmes to improve energy access and disaster risk reduction contribute to Nepal's efforts to achieve the Sustainable Development Goals.

Project Information

Project title: Comprehensive Disaster Risk Management Programme
Project period: 2011–2017
Implementing partners: Ministry of Home Affairs
Funding partner: United Kingdom (DFID), European Commission (ECHO), Government of the Republic of Korea, World Bank and UNDP (BPPS, TRAC)
Total project investment: $21.83 million

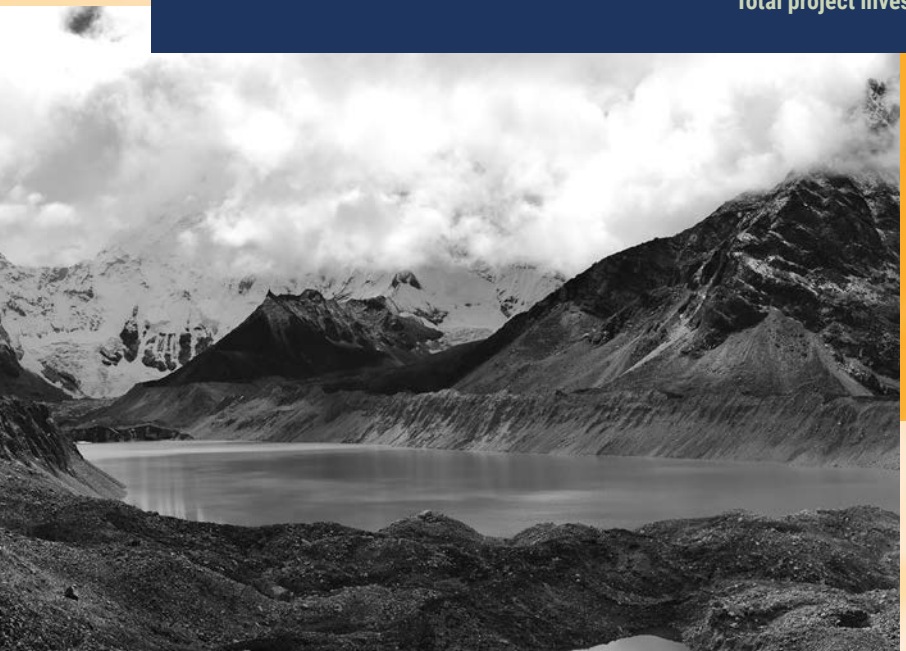
Project title: Rapid Enterprise and Livelihoods Recovery Project
Project period: 2015-2016
Implementing partners: Ministry of Industry
Funding partner: Government of Australia
Total project investment: $6.39 million

Project title: Livelihoods Stabilization and Enterprise Recovery project
Project period: 2016
Implementing partners: Ministry of Industry
Funding partner: Government of Denmark
Total project investment: $644,000

Project title: Community Based Flood and Glacial Lake Outburst Risk Reduction Project
Project period: 2013–2017
Implementing partners: Department of Hydrology and Meteorology
Funding partner: Least Developed Country Fund (LDCF)
Total project investment: $7.57 million

Project title: Renewable Energy for Rural Livelihood
Project period: 2014–2019
Implementing partners: Ministry of Population and Environment
Funding partner: Least Developed Country Fund (LDCF), Government of Nepal, Government of Norway and the Government of the Republic of Korea
Total project investment: $5.31 million

Project title: Community Infrastructure and Livelihood Recovery Programme
Project period: 2015–2017
Implementing partners: Ministry of Cooperatives and Poverty Alleviation
Funding partner: Government of Mauritius, Bridgehead Ltd., International Medical Corps
Total project investment: $3.9 million



PAKISTAN

50 mm
people affected by disasters over the past decade

20%
reduction in emissions as National climate targets

60 mts
distance that glaciers are receding per decade

80%
of energy provided by oil and gas

Earthquakes, extreme temperatures, floods, landslides, storms and landslides have affected more than 50 million people in Pakistan over the past decade, with damages and loses estimated at $25.5 billion. The massive floods experienced in 2010 alone affected 20 million people and at least one fifth of the country's land mass was submerged in water. Climate change scenarios for Pakistan indicate that the country will face higher temperatures and the melting of glaciers in northern Pakistan leading to more water stress, more heavy flooding and more frequent and intense extreme weather events.

UNDP's support to Pakistan enhances institutional systems and strengthens local-level capacities in the areas of climate change, energy and disaster risk reduction – helping the country meet its commitments under the Paris Agreement and accelerate Sendai Framework priorities. Targets include improved energy efficiency and conservation, increased trust in the country's use of climate finance, the reduction of risks from Glacial Lake Outburst Floods (GLOFs) and strengthened institutional capacity for disaster risk reduction.

Improved Early Warning, Preparedness and Risk Reduction

The Himalayan Karakorum Hindukush (HKH) mountain ranges in northern Pakistan hold the largest glaciers in the world outside the polar regions. Many glaciers are receding at a rate of almost 40 to 60 metres per decade. As this happens, Glacier Lake Outburst Floods, have the potential to release millions of cubic metres of water, posing serious threats to the lives, livelihoods, infrastructure and economic assets of tens of thousands of people. UNDP is working with the Government to improve knowledge and capacities around GLOFs and disaster risk reduction more broadly. Particular attention is being paid to improve hydrological forecasting, risk mapping and local-level early warning and preparedness. Initial support has included community-based GLOF risk management in the Bagrot and Bindogol valleys. Working with local authorities, existing infrastructure such as gabion walls, diversion walls and bridges have been strengthened to provide protection, and safe assembly points and evacuation routes have been identified. Community-based disaster risk management committees and village hazard watch groups, critical to life-saving response, have been trained in disaster preparedness and response skills, and provided with new equipment and disaster recovery supplies.

Regarding technology, the Pakistan Meteorology Department has installed automatic weather stations, rain gauges and discharge-measuring equipment throughout the region. This builds on existing local networks and traditional practices for early warning, and supports an estimated 66,000 people throughout the valleys.

Given the success of the initial GLOF project, which was supported by the Adaptation Fund, UNDP worked with the Government to prepare a new initiative for submission to the Green Climate Fund. The project, approved in 2016, will help procure and install 50 automatic weather stations and 408 river discharge gauges/sensors. These monitoring instruments will provide the requisite data for hydrological modeling to generate flood risk scenarios, and feed into a flood early warning system able to give warning signals on a 24-hour basis. Small-scale structures such as gabion walls and check dams will be constructed, to protect human lives and assets. UNDP also will support local and national authorities as they incorporate climate change adaptation considerations into development plans.

In addition to the GLOF project, UNDP's work on disaster risk reduction includes a five-year project focused on institutional support to the National Disaster Management Authority (NDMA), as well as a three-year joint programme with the Food and Agriculture Organization and World Food Programme, on the implementation of Pakistan's National Disaster Risk Reduction Policy.

The Critical Role of Energy

With an over-reliance on fossil fuels, a significant portion of the population lacking energy access and unreliable electrical service throughout much of the country, Pakistan is taking steps to achieve the key elements of Sustainable Development Goal 7 on clean energy: improve energy access and energy efficiency, and expand the use of renewables. In doing so, Pakistan is also making progress on its commitments under the Paris Agreement, which includes a net 20 percent reduction in greenhouse gas emissions.

Pakistan is highly dependent on oil and gas, which provide over 80 percent of its energy supply. Hydroelectricity provides 11 percent while solar, wind and biomass contribute only 2 percent. At the same time, 27 percent of the country's population (51 million people) live in areas without electricity. And even in areas with electricity, supply capacity is limited. According to one study, 73 percent of the country's population (144 million people) experience more than 12 hours of blackouts a day.

A lack of energy access not only impairs development progress contingent on electricity, but affects the natural environment. Firewood is used by 60 percent of households for cooking, which contributes to deforestation and soil erosion, further exposing populations to flooding and landslides, and reducing the country's natural ability to absorb carbon. Access to energy is therefore critical to the country's development, while improved energy efficiency is needed to support efforts to reduce greenhouse gas emissions.

UNDP works closely with the Government of Pakistan on its energy initiatives and has been facilitating the design of its first National Action Plan for Sustainable Energy for All. This includes a thorough diagnostic of the country's energy sector through a series of consultations at national and local levels with relevant public sector ministries, research and academic institutions, donor agencies, the private sector and civil society. The process has produced an overview of the energy position of the country (e.g. the energy gap between demand and supply), a map of federal and provincial energy policies and projects, and the main challenges and opportunities in each region.

The Action Plan based on this detailed analysis, now being finalized and approved, presents a sector-wide and long-term roadmap outlining how Pakistan will achieve the three objectives of energy access, efficiency and renewables. This includes tapping into the country's large renewable energy potential, as well as strategies to improve energy efficiency and conservation. The Action Plan also includes specific targets to be reached by 2030, for example, to connect over 35 million households to the national electricity grid and add 27,415MW of renewable energy sources to the country's energy mix. This includes the conversion to solar energy of government schools, colleges and universities with priority given to districts in the country that have the highest incidence of poverty.

Climate Commitments and Access to Climate Finance

Pakistan is taking steps to ensure that its use of climate resources is transparent and effective in its endeavours related to the Paris Agreement. UNDP supports these efforts and has been working with the Government to make better use of existing national resources; to access multilateral funding sources such as the Green Climate Fund; and to improve transparency around the use of resources. To ensure that resources from Pakistan's national budget are allocated for a full range of necessary mitigation and adaptation initiatives, the Government will need to mainstream climate finance into planning and budgeting systems across all sectors and ministries, and at all levels of government.

UNDP has provided technical assistance and institutional capacity development to improve the use, tracking and budgeting of climate finance in the country. This included working with the Government to carry out a Climate Change Public Expenditure and Institutional Review, which was used to assess Pakistan's climate-related expenditures and identify areas for improving cost effectiveness. Specifically, the review, which was completed at the federal level as well as in Khyber-Pakhtunkhwa, Azad Jammu & Kashmir and Gilgit–Baltistan, revealed that expenditures on climate change represented 6 percent of the total federal budget in 2013–14, with over half the total federal climate change expenditure related to mitigation. The review also helped identify areas to improve financing, such as greater coherence in mainstreaming climate change into the country's sectoral policies, more consistent resource allocation for climate change to relevant government institutions, and a more standardized practice in the selection of climate change in development expenditures and allocations.

The next step for UNDP is to support the Government to develop a Climate Change Financing Framework based on the results of the review. The framework will help Pakistan to systematically track, manage and report climate-related expenditure. UNDP will provide technical assistance to the Ministry of Finance to integrate the new framework into its reporting mechanisms and national budget, and to design a functional climate change budget coding system. This will enable Pakistan to have a clear and improved budgeting system with greater transparency and accountability.

Project Information

Project title: Sustainable Energy for All
Project period: 2013-2017
Implementing partners: Ministry of Planning, Development and Reforms
Funding partner: UNDP
Total project investment: US$70,000

Project title: Strengthening the Governance of Climate Change Finance
Project period: 2015-2016
Implementing partners: The Ministry of Finance
Funding partner: Government of United Kingdom (DFID)
Total project investment: $1 million

Project title: Reducing Risk and Vulnerability from Glacial Lakes Outburst Floods (GLOF) in Northern Pakistan
Project period: 2010-2016
Implementing partners: Pakistan Ministry of Environment and Ministry of Climate Change
Funding partner: The Adaptation Fund
Total project investment: $4,100,000

Project title: Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan
Project period: 2011-2015
Implementing partners: Ministry of Climate Change
Funding partner: Green Climate Fund, and Government of Gilgit - Baltistan
Total project investment: $37.4 million

FIJI

In February 2016, Fiji was struck by one of the most powerful storms on record in the Southern Hemisphere. Tropical Cyclone Winston devastated critical sectors and affected tens of thousands of people. At the same time, a strong El Niño event brought dry conditions that exacerbated the cyclone's impact and led to water shortages, food insecurity and health issues. UNDP supports efforts to build resilience to climate change and disasters through risk-informed recovery and development, focusing on the people, mechanisms and processes of decision making and governance.

30,000 homes damaged by Cyclone Winston

$0.9 billion in damages by Cyclone Winston

60% of population's livelihoods compromised

100% commitment to renewable energy by 2030

Risk-Informed Recovery from Tropical Cyclone Winston

Tropic Cyclone Winston was one of the most powerful cyclones ever recorded in the Southern Hemisphere and the first Category 5 cyclone to directly impact Fiji. Wind speed reached a maximum average of 233km/hour and gusts peaked at around 306km/hour. It resulted the damage and destruction of 30,369 houses, 495 schools and 88 health clinics and medical facilities. In addition, the cyclone destroyed crops on a large scale and compromised the livelihoods of almost 60 percent of Fiji's population. The estimated value of disaster effects arising from Tropical Cyclone Winston in Fiji was F$1.99 billion (US$0.9 billion).

Following the cyclone, UNDP prioritized "risk-informed" national recovery and reconstruction that is sustainable and resilient over the long term. Through the United Nations Central Emergency Response Fund (CERF), UNDP partnered with the Ministry of Agriculture and the Commissioner of the Central Division to provide humanitarian supplies (e.g. temporary offices, shelter, food, drinking water and laptop computers) for critical government and support staff charged with coordinating assistance to farmers.

A detailed needs assessment led to debris clearance of farm land. A CERF-funded joint intervention between UNDP and FAO provided tools, equipment and awareness raising complemented by training and certification from the Forestry Department and work programmes through the Ministry of Youth. The project improved the debris situation in the villages and assisted other recovery activities through the reuse of debris as material for building more resilient shelter, sanitation, and home gardens.

UNDP partnered with Habitat for Humanity Fiji, Australia's Department of Foreign Affairs and Trade (DFAT) and the International Organization for Migration (IOM) to implement training of more than 100 community carpenters on good building practices that will be cyclone-resilient. The initiative resulted in construction of 12 community shelters for storage or working space, along with an advocacy campaign on safe reconstruction in the 12 communities.

To support food security and resilient agricultural recovery, UNDP coordinated with the Ministry of Agriculture and FAO to provide agriculture inputs (with specific attention to traditional crops) and training on best practices for resilient farming. In addition, UNDP worked with women's groups to re-establish weaving using pandanus leaves.

Finally, UNDP contributed to the establishment of an After Action Review (AAR) working group to capture best practices and lessons learned by the different stakeholders involved in these experiences, to inform future responses by formulating recommendations for long-term resilience.

Risk-Informed Subnational Development Planning

In the country's four sub-national divisions, posts dedicated to resilient development, initially supported by UNDP Pacific Risk Resilience Programme (PRRP), are providing the critical in-house capacity needed to risk-inform subnational development decision making, planning, budgeting and implementation. One division established a geographical information system (web-based platform) that collates information on development needs, vulnerabilities as well as climate and disaster risks. It has been used, for example, to track which evacuation centres were open following flooding and to identify areas most at risk of water shortages – as in the case of Korobebe, which now has a rainwater harvesting project. More than 50 communities are prioritized for assistance from the development budget to integrate risk into their local development processes.

Local government are using a Community Capacity Building (CCB) tool to guide a community development planning process that is risk-informed, inclusive and promotes the participation and leadership of marginal groups. The resilient development posts in the divisions are key to these efforts, which also include training of trainers in local government. As a result, community development plans are more gender sensitive and better reflect local priorities. The Tikini Mali community development plan, for example, called for rehabilitating degraded forest with native species to stabilize slopes and provide a flood buffer and a source of income, a project then funded by the government. In a larger government project, the CCB tool was used in the relocation of Tukuraki, a village vulnerable to landslides, with measures to address waste management, a retaining wall against landslides, exclusion zones to reduce bushfire risk, cyclone-proofed housing and storm water drains as well as beekeeping, farming, and fish ponds for income generation. Following advocacy from the Commissioner of the Northern Division and national endorsement of the approach, risk-informed development is being scaled up to all four geographical regions of Fiji.

Climate Change Mitigation and Adaptation

The Government of Fiji is working with UNDP across several initiatives to lessen the negative impacts of climate change, including through strengthening the enabling environment for renewable energy sources such as hydro power and biofuel. Pre-investment work concerns a public private partnership (PPP) for a rural community-based hydro power plant. Activities also aim to help Fiji to recognize bankable investment opportunities and develop a standardized power purchase agreement to engage potential investors in renewable energy, through Fiji's independent power producer (IPP) and an investment framework. Plans are underway to hold the country's first national renewable energy investment forum.

Cost-effective options are now available for using excess biofuel produced from the mills on Fiji's two main islands, Viti Levu and Vanua Levu, thanks to a public private partnership to transport, store and distribute the fuel. The project's main goals are to ensure the supply of reliable electricity, continual maintenance and operation of an existing hydro power plant, and cost coverage of the power production. The effort also supports income-generating activities for three villages, where provision of electricity will lead to improved economic conditions by creating jobs, bringing in additional income and supporting new development opportunities.

As climate change poses major long-term risks to all resources in Fiji, with potentially stronger cyclones, changes in rainfall, sea level rise, coral bleaching and ocean acidification, adaptation is key to protecting people and communities. The upcoming Ridge to Reef (R2R) project aims to build resilience to deal with such threats in the longer term. The project will plant trees in dry zones, run fire education and awareness campaigns in priority catchments, support national forest fire policy and legislation, restore river banks and reforest areas in the upper catchment, and develop a more resilient Marine Protected Areas network for coastal areas.

To better strengthen the role of women in climate change adaptation and mitigation efforts, the Protection in the Pacific (ProPa) network, launched in 2015, promotes gender equality in issues related to climate change and disasters. This regional platform is supported by UNDP and includes national officials and the holders of the recently-created posts dedicated to resilient development within relevant ministries.

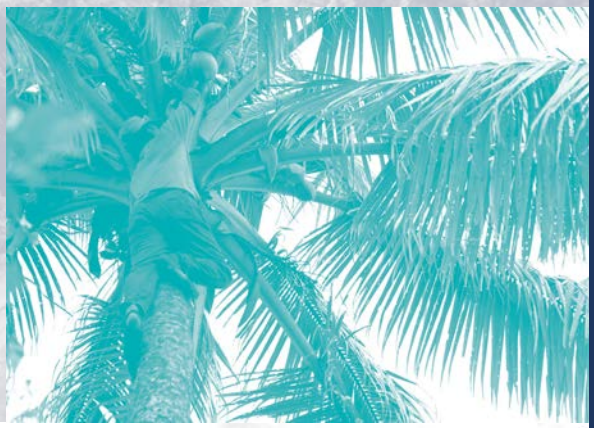
ProPa has successfully advocated for the inclusion of gender and social inclusion in the regional *Framework for Resilient Development in the Pacific (FRDP)*. ProPA has enabled national gender and protection clusters (including the Fiji cluster) to function beyond the humanitarian disaster phase towards longer-term development; assessed the gender and social dimensions of vulnerability to risks (e.g. land rights and migration); and mobilized funding for implementing gender-sensitive recovery and development. ProPA is in a strong position to influence the replication and scaling-up of gender-sensitive risk-informed development.

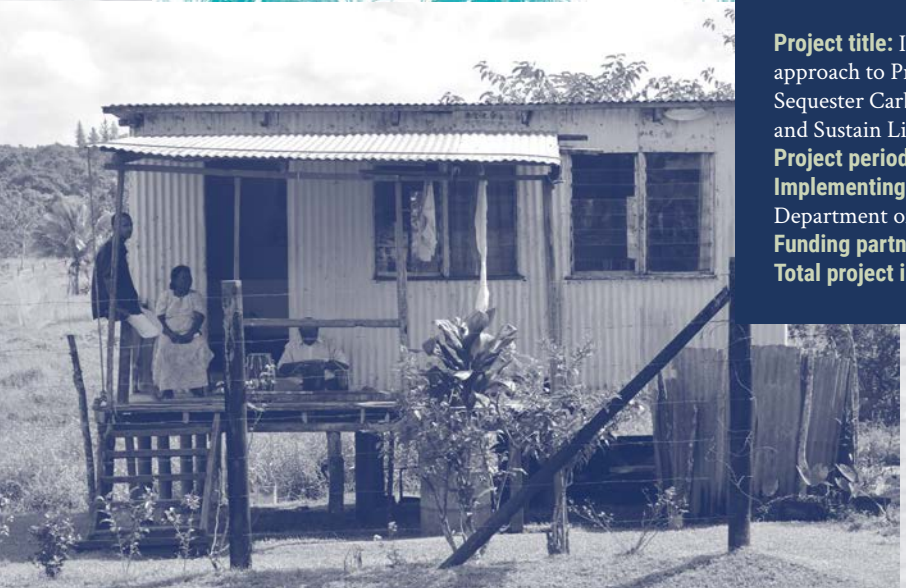
The Private Sector, Resilient Recovery and Climate-Sensitive Tourism

The private sector is increasing its contribution to Fiji's work in community resilience and disaster response and recovery. UNDP has brokered partnerships between the government and private sector in Fiji, including with tourism operators that help communities build food banks as a preparedness measure for cyclones and with telecommunications operators that help collect data on damage following such disasters.

More recently, UNDP has helped establish the Fiji Business Disaster Resilience Council (FBDRC), a network for coordinating business engagement with the Fiji Government, development partners and other actors before, during and after emergencies. The network has more than 70 members, meets monthly and provides regular training and connectivity with government and NGO partners. It is chaired and coordinated by the private sector, holds a seat on Fiji's national Disaster Management Committee, and funds a full-time post to run the network. FBDRC has advocated for private sector priorities in the region and is helping to strengthen the resilience of the private sector itself, by providing training (particularly to small and medium enterprises) on business continuity. The FBDRC has significantly improved information flow, relationships and connectivity between government response and recovery mechanisms and the private sector in Fiji. This successful model has been replicated in Vanuatu and there is interest from Tonga, Samoa and the Solomon Islands.

By assisting the Government of Fiji to strengthen risk governance, UNDP is helping the government to achieve priorities identified in the draft National Development Plan and to ensure that recovery following a disaster is risk informed and contributes to resilience. UNDP works with the government and private sector at all levels to put in place strong governance foundations so that risk-informed development can be sustained in future planning and budgeting processes, tools, plans and policies.





PROJECT INFORMATION

Project title: Pacific Risk Resilience Programme
Project period: 2013–2018
Implementing partners: Ministry of Agriculture, Rural and Maritime Development and National Disaster Management
Funding partner: Government of Australia, Department of Foreign Affairs and Trade (DFAT)
Total project investment: $2.2 million

Project title: Tropical Cyclone Winston Recovery Project
Project period: February 2016–December 2016
Implementing partners: Ministry of Agriculture, Ministry of Youth and Sport, Food and Agriculture Organization of the United Nations (FAO), World Food Programme (WFP), Habitat for Humanity
Funding partner: United Nations Central Emergency Response Fund (CERF)
Total project investment: $116,050 (CERF) and $65,000 (Youth) & livelihood/construction

Project title: Fiji Renewable Energy Power Project
Project period: December 2012–December 2017
Implementing partners: Department of Energy
Funding partner: Global Environment Facility
Total project investment: $975,000

Project title: Implementing a Ridge to Reef approach to Preserve Ecosystem Services, Sequester Carbon, Improve Climate Resilience and Sustain Livelihoods in Fiji
Project period: October 2016–December 2020
Implementing partner: Department of Environment
Funding partner: Global Environment Facility
Total project investment: $7.39 million

LATIN AMERICA

CUBA

600,000 affected by Hurricane Matthew

97 Risk Reduction Management Centres established

347 Early Warning Points established as of 2016

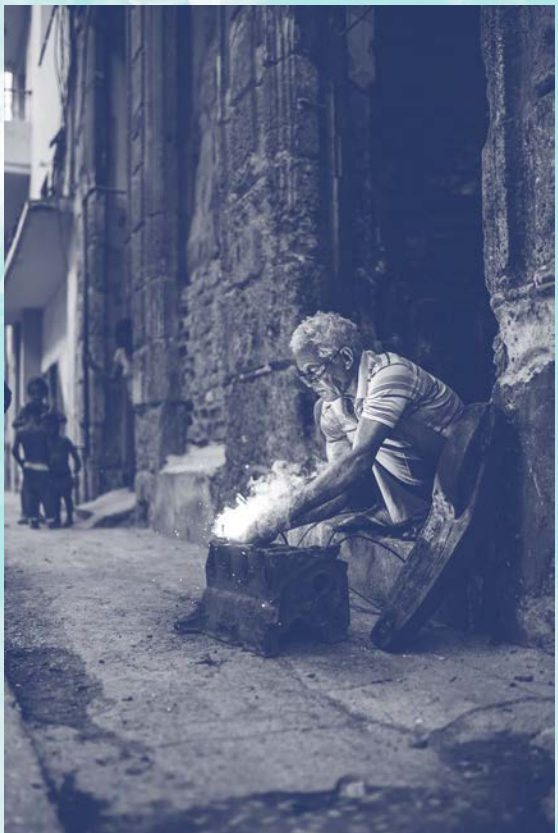
300,000 people to benefit from disaster warning

Nine hurricanes and tropical storms struck Cuba between 2000 and 2016. The country's 11 million people are frequently exposed to weather-related disasters, including hurricanes, tropical storms, drought and floods. Scenarios for climate change show an average increase in temperature ranging from 2.6 to 4.5 degrees Celsius over the next century, with annual precipitation expected to decrease between 15 and 60 percent. Water availability will likely be reduced by 37 percent by 2100. In addition, sea level rise will threaten coastal communities and ecosystems, and will increase saltwater intrusion with consequences for water availability, soil fertility and agriculture.

UNDP and the Government of Cuba have a significant project portfolio that supports the country's aspirations to reduce disaster risks and to mitigate and adapt to the world's changing climate. This support includes post-disaster recovery efforts, a focus on urban resilience, and work to enhance the adaptive capacity of farmers and coastal communities.

Building Resilience in Havana and Santiago

Hurricane Matthew, a category 4 hurricane, hit the Eastern provinces of Cuba in 2016 with high winds and waves up to eight metres. More than 600,000 people were affected and 38,000 homes damaged. This devastation came on the heels of Hurricane Sandy, which struck the provinces of Santiago de Cuba and Holguin in 2012, damaging or destroying more than 243,000 homes and affecting an estimated 3 million people.



The UNDP response to Hurricane Matthew ranged from immediate relief efforts to working with the Government of Cuba on longer-term plans. UNDP provided temporary shelters for those who were left homeless and then supported more durable housing solutions by supplying zinc sheets, roofing modules, specialized tools and mills to transform debris into building materials. This work also generated jobs and facilitated the recovery of the local economy.

Government authorities are working with UNDP to build the resilience of urban areas, helping reduce the risk of similar events in the future. Poor construction methods contribute to the vulnerability of many public and private buildings. In the past, lives have been lost in the collapse of buildings that were not built to withstand storms or strong winds.

Three cities at risk are the focus of a capacity-development initiative of UNDP and the National Institute of Physical Planning and Civil Defense that aims to strengthen national and local capacities in disaster risk reduction. In the cities of Bayamo, Havana and Santiago de Cubaare, which are exposed to recurrent flooding, hurricanes and earthquakes, an important first step was to update the legal and normative frameworks needed to support resilient urban planning. Methodologies and guidelines are being developed to help implement the revised policies, thus far including the *Basic Guide to Urban Planning, Technical Manual for Urban Resilience* and *System of Indicators on Urban Resilience*. These methodologies will be instrumental in guiding future resilient urban planning processes in Cuba.

Special threat studies are being designed or updated for the three cities. These 'Risk, Hazard, and Vulnerability' studies identify the hazards threatening a specific location as well as the communities, economic activities and infrastructure that are exposed to these threats. The findings are used to define the measures needed to protect the population and livelihoods, and to inform municipal DRR plans. Informing the DRR plans with current data is important because they outline future actions and budget allocations for prevention, preparedness, response and recovery. Guidance on how to conduct these studies has been introduced in pilot areas within Bayamo, Havana and Santiago de Cuba.

Improved Flood Early Warning in Sancti Spíritus and Villa Clara

Frequent flood events due to heavy rains, hurricanes and tropical storms endanger communities, agricultural activities and economic infrastructure in the provinces of Sancti Spíritus and Villa Clara yet early warning systems are weak. The systems in these provinces have limited monitoring and forecasting capacity, and existing risk reduction plans do not take into account the latest information available on local hazards and risks.

UNDP has provided equipment to improve existing meteorological and hydrological stations and expand the monitoring systems to areas not previously covered, notably in the Zaza and Agabama river basins. Efforts have also focused on improving information flows and communication mechanisms to supply news when and where needed.

Community-level meetings organized with Civil Defense have raised public awareness about risks and vulnerabilities, as have training workshops conducted for local authorities and decision makers. Local radio and television stations have broadened the outreach of the awareness-raising campaign.

Five Risk Reduction Management Centres (RRMCs) have been established in high-priority municipalities in Sancti Spíritus and Villa Clara, and 15 Early Warning Points link localized information from high-risk communities with the nearest RRMC. Plans are underway for additional RRMCs in the two provinces. UNDP has supported the RRMC initiative since 2005 at national and regional level, systematizing the experience for replication. As of 2016, 97 RRMCs and 347 Early Warning Points have been established across Cuba, and the approach has been replicated in five more countries in the Caribbean region.

Combined, these measures protect vulnerable communities from future floods, secure livelihoods and safeguard public institutions such as local schools and health facilities. When completed, this initiative will directly benefit close to 40,000 people living in the Zaza and Agabama river basins; a wider population of 300,000 will be reached by improved early warning systems.

Adaptation Technologies for Cuban Farmers

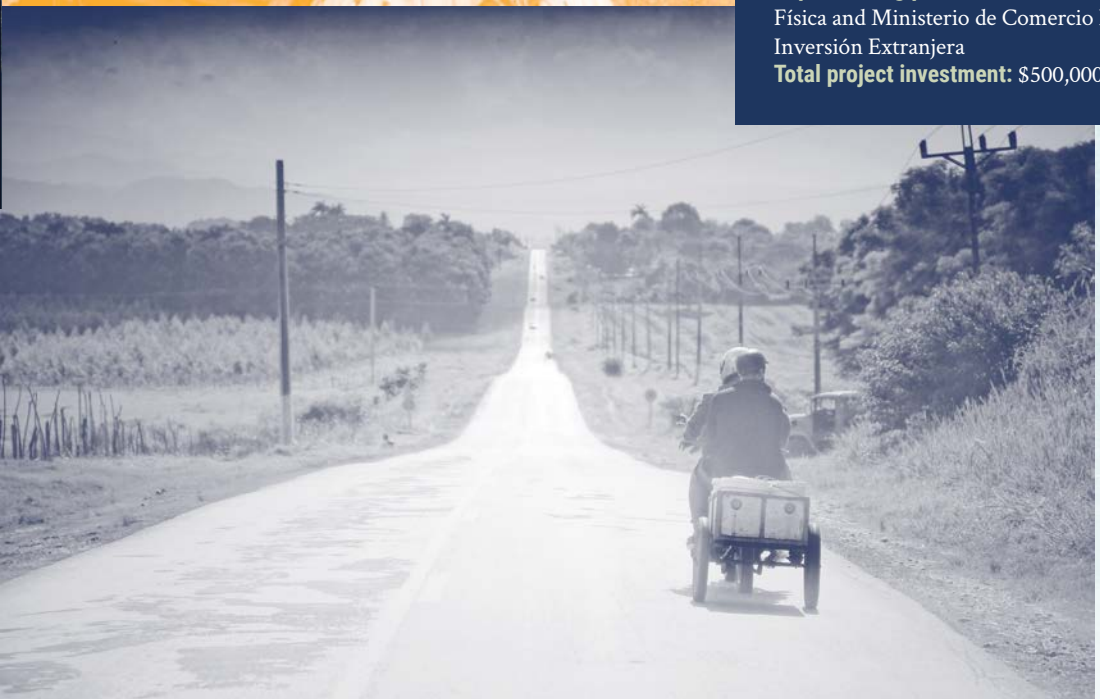
Crops in Cuba are regularly destroyed by storm surge and flooding while increasing temperatures and reduced rainfall steadily diminish agricultural yield and productivity. The impact on small-scale farmers can be devastating. Without support to adapt to climate change, farmers are likely to be further affected by growing water scarcity and the salinization of soil from seawater intrusion.

The Government is applying sustainable and innovative natural resource management and agricultural practices. UNDP is supporting a number of efforts to reduce the adverse effects of climate change on agriculture, including knowledge exchanges and pilot demonstration sites.

One of these initiatives includes promoting knowledge exchange on best practices between farmers, encouraging cooperation and collaboration both regionally and locally. Knowledge exchanges provide ongoing opportunities to share effective adaptation practices and successful experiences. These exchanges have been further enhanced by South-South cooperation and collaboration between Cuba and Brazil, Bolivia, Chile, Colombia, the Dominican Republic and Nicaragua. For example, the conservation agriculture work of Brazil and the food processing microenterprises models of Peru have been transferred to Cuba and have already proved successful with farming communities.

In 2015 and 2016, demonstration sites were established in three municipalities to pilot agricultural adaptation practices. Demonstration sites in Los Palacios promoted the cultivation of improved rice varieties adapted to local weather conditions; conservation agriculture was demonstrated in Güira de Melena; and the pilot introduced forest, dairy and beef farming in Jimaguayú. These pilot projects have already shown some positive impact. For example, farmers employed conservation agriculture practices on more than 2,500 hectares of land, with use of organic materials and green fertilizers, crop rotation, permanent soil cover and minimal soil disturbance techniques. In Jimaguayú, 20 hectares of land were prepared using silvopasture, a farming practice that combines trees and pasture for complementary and sustainable forest and livestock production. A food processing micro-industry was established to produce fruit juices, pulp, jams, paste and other fruit-based products to supply local markets, benefitting both local farms and rural enterprises.

These pilot projects in the three municipalities have long-term support through their Climate Change Adaptation Plans. The plans define the adaptation actions that can be implemented in the coming years, taking into consideration each geographic location and context. Ultimately, the project aims to expand to another 30 vulnerable municipalities to multiply the use of adaptation technologies among Cuban farmers.



PROJECT INFORMATION

Project title: Environmental Foundations for Local Food Sustainability
Project period: 2012–2017
Implementing partners: Ministry of Agriculture
Funding partner: European Union and Swiss Agency for Development and Cooperation
Total project investment: $6.3 million

Project title: Strengthening the Early Warning Systems in the Zaza and Agabama River Basins
Project period: 2015–2016
Implementing partners: Ministerio del Comercio Exterior y la Inversión Extranjera
Funding partner: European Commission Department of Humanitarian Aid and Civil Protection's Disaster Preparedness ECHO Programme (DIPECHO)
Total project investment: $1.07 million

Project title: Contribution to Urban Resilience in Cuba's Main Cities
Project period: 2014–2016
Implementing partners: Instituto de Planificación Física and Ministerio de Comercio Exterior y la Inversión Extranjera
Total project investment: $500,000

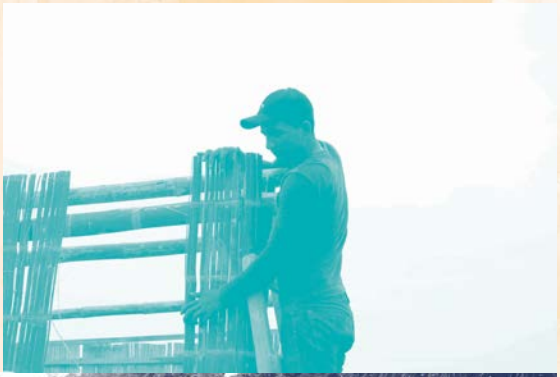
ECUADOR

+1 million
people affected by 2016 earthquake

35,000
homes destroyed by 2016 earthquake

109,000
hectares of forest lost per year, 2000-08

41%
pledge to reduce energy sector emissions by 2030



UNDP is helping Ecuador to build back better, stronger and more resilient following a devastating earthquake in 2016. Risk-informed zero-carbon development is central to future efforts to deliver development in this climate-vulnerable country, which has a high risk of death from natural hazards. Early and long-term recovery efforts of the Government includes livelihood support, post-disaster needs assessment and recovery planning and support to strengthen longer-term disaster risk reduction measures. UNDP supports the country's commitment to preventing deforestation and to preserving national carbon stocks. This work advances Ecuador's progress under the Sendai Framework as well as the Paris Agreement.

Recovering From the 2016 Earthquake

A 7.8-magnitude earthquake struck northern Ecuador on 16 April 2016 leaving 673 dead and some 230,000 wounded. Over 1 million people were directly or indirectly affected. With 35,000 homes destroyed or damaged, more than 140,000 people were left without adequate homes. UNDP worked with the Ministry of Urban Development and Housing, as well as other government institutions, to organize and coordinate a first rapid building assessment, followed by a more detailed needs assessment. These measures helped determine the number of affected families in each province as well as the number of destroyed or damaged houses, schools and roads. Almost 600 specialized volunteers, mainly architects and engineers, received training to assess affected structures and determine the level of risk. Results from these assessments formed the basis for both immediate decisions and the development of a post-earthquake recovery and reconstruction plan.

In another early initiative supported by UNDP, local authorities removed significant amounts of rubble left by the earthquake and demolished damaged structures, guided by technical experts and specialists brought in to lend their expertise in demolition and environmental management. At the same time, community level "cash for work" projects employed people affected by the earthquake, providing an income to those who lost their livelihoods while also contributing to the recovery effort. In the province of Manabí, for example, nearly 500 people contributed to the removal of some 20,000 m3 of debris.

As debris was removed and space cleared, displaced families returned to their communities to rebuild homes and re-start their businesses. Working in partnership with local governments, parish councils and communities, UNDP's efforts turned to rehabilitating or rebuilding basic community infrastructure to reactivate local economic activity and people's livelihoods. In rural areas, for example, rebuilding irrigation canals, rice mills and supply stores helped to reactivate agriculture and fisheries. As of 2017, traditional fishing and agricultural associations are also receiving support through UNDP's Supplier Development Programme, which has already provided nearly 800 families with assistance to expand their list of clients, improve quality and sales and engage in new equitable commercial relationships.

In some urban centres affected by the earthquake, UNDP fosters entrepreneurship among small and micro enterprises that sustain many of the urban poor. Through the "In Motion" initiative, technical assistance is provided for innovation, better business practices, new products and higher quality and service standards. Over 530 families have recovered their businesses in the cities of Manta, Portoviejo, Bahia de Caraquez and Pedernales, and another 160 small shop owners have been able to reactivate their micro-enterprises in Manta.

Community associations are important local resources for people affected by the earthquake, and the campaign "Reactivate Sustainable Communities" includes a crowdfunding platform. Funds mobilized via national magazines and social networks are being used in seven communities in Manabí to help the local population recover their businesses and livelihoods, notably in the areas of tourism, farming, agroecology, honey and sea salt production.

Over the long term, Government capacity to respond to disasters, to continue delivering basic services and especially to undertake resilient recovery is critical. UNDP has worked closely with national and local authorities to support coordination and planning of overall recovery efforts, by transferring knowledge and practical tools that have been developed in similar crisis situations in other countries. There are new Ecuadorian standards and guidelines for design and construction, as well as guidelines for the Assessment and Rehabilitation of Structures, developed with the Ministry of Urban Development and Housing.

Planning a sustainable post-earthquake recovery process is another area in which UNDP has provided assistance. Working with Ecuador's National Planning Ministry and other government bodies, municipal authorities received technical support in designing both national and local recovery plans. This was supported by efforts to update municipal land use plans, ensuring that they take into account disaster risk reduction requirements. The aim is to ensure that reconstruction projects "build back better", with infrastructure that will be able to withstand future seismic activity in the affected areas as part of long-term resilience.

In keeping with the Sendai Framework and UNDP's commitments under the tripartite agreement on disaster recovery with the World Bank and European Union, UNDP's support to Ecuador following the 2016 earthquake has included both early and long-term recovery support. From immediate livelihood support to debris removal to post-disaster needs assessments and recovery planning, UNDP has helped the country both stabilize and strengthen.

Achieving Net Zero Deforestation

Ecuador lost an average of 109,000 hectares of forest per year in Ecuador 2000–2008, according to Government data.[1] These deforested areas were transformed to agricultural lands. Since then, however, Ecuador has made significant progress and has reduced carbon emissions released during deforestation, following the country's adoption of a new constitution and related strategies. The Government is an active participant in the REDD+ mechanism of the UNFCCC, which encourages countries to reduce emissions from deforestation and enhance carbon stocks in forests.[2] Ecuador has successfully reduced its emissions from deforestation from an annual average of 43.4 Mt CO2e from 2000–2008 to an annual average of 29 Mt CO2e from 2009–2014.[3] In the same period, Ecuador increased its agricultural productivity by almost nine percent, suggesting that reducing emissions from deforestation is not contrary to higher agricultural production.

Through the UN–REDD Programme[4], UNDP has been working Ecuador's government for more than five years, in partnership with FAO and UNEP. During this process, the partners have analyzed the direct and indirect drivers of deforestation in Ecuador from economic, financial, political, social and technical perspectives; identified historical patterns of deforestation in the country along with geographical areas with similar deforestation profiles; defined specific national and local-level measures to address the drivers of deforestation (such as livelihoods and charcoal production); and sought to maximize benefits through cost efficiency, reduction of social and environmental risks and other methods.

This process culminated in the endorsement of Ecuador's National REDD+ Action Plan. The Plan addresses the drivers of deforestation in the country and supports national targets to reduce deforestation and increase the country's forest coverage, a key element in the country's commitments under the Paris Agreement. Specific strategies in the REDD+ Action Plan include improving controls to limit agricultural expansion into forest areas; optimizing existing mechanisms to implement agricultural and livestock production practices that reduce deforestation; and strengthening the restoration and conservation of vulnerable watersheds. This Action Plan will be implemented under the leadership of the Ministry of Environment, with participation from the Ministries of Agriculture, Foreign Trade and Production, as well as national and private banks, tax services, local governments, civil society organizations and indigenous communities. Ecuador is the second country worldwide (after Brazil) to finalize its REDD+ readiness process.

UNDP will support the implementation of the National REDD+ Action Plan over the next five years through two projects approved in 2016: a $41 million project approved by the Green Climate Fund and a $12 million project financed by the Global Environment Facility. Ecuador is the first country to receive financial support from the Green Climate Fund for phase 2 of the REDD+ initiative. This support is critical to empowering Ecuador to meet its commitments, including those under the NY Declaration on Forests and a recently signed free trade agreement with the European Union.

By supporting the implementation of the National REDD+ Action Plan, UNDP will help Ecuador mitigate its impact on climate change and achieve its commitments under the Paris Agreement. The country's NDC recognizes the importance of the forestry sector in mitigating climate change, and gives priority to the appropriate management of forestry resources. In addition, post-earthquake recovery efforts in Ecuador are contributing to the Sendai Framework by taking into account risk reduction measures that support efforts to 'build back better' in recovery. This will ensure, for example, that new housing and infrastructure will be able to withstand future seismic activity.

PROJECT INFORMATION

Project title: Priming Financial and Land-Use Planning Instruments to Reduce Emissions from Deforestation
Project period: 2017–2022
Implementing partners: Ministry of Environment
Funding partner: Green Climate Fund
Total project investment: $41.17 million

Project title: Apoyo a la finalización de la fase de preparación para REDD+ en Ecuador y arranque de la implementación del Marco de Varsovia para REDD+
Project period: 2015–2017
Implementing partners: Ministry of Environment (Secretariats of Climate Change and Natural Heritage)
Funding partner: UN–REDD
Total project investment: $683,074

Project title: Strengthening Institutional and Community Capacity at National and Local Levels, to reduce vulnerability to seismic events in Ecuador, as a contribution to the process of the New Ecuadorian Construction Code NEC implementation DIPECHO–NEC
Project period: May 2015–December 2016
Implementing partners: Secretariat of Risk Management
Funding partner: ECHO, UNDP, local governments of Ibarra and Durán
Total project investment: $930,000

Project title: Emergency Livelihoods and Social Protection Interventions in Rural Communities of the Provinces of Manabi and Esmeraldas after the 16A Ecuador Earthquake
Project period: August 2016–August 2017
Implementing partner: UNDP, AVSF, Ceiba Foundation, UN Women
Funding partner: ECHO, UNDP
Total project investment: $1.12 million

THE CARIBBEAN SMALL ISLAND STATES

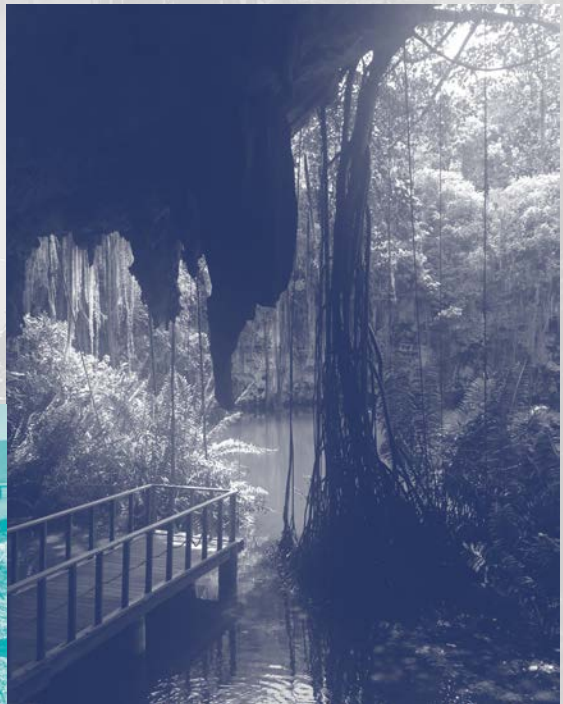
Small island developing states (SIDS) in the Caribbean are regularly affected by extreme weather events, including tropical storms, hurricanes, floods and drought. Climate change threatens to make these events more frequent and severe. Higher temperatures and reduce seasonal rainfall are projected by 2050. Sea level rise will submerge coastal areas. Coastal erosion will adversely impact human settlements, infrastructure and the tourism industry, especially for islands such as Dominica, where 90 percent of the population lives along the coast. Freshwater resources are under threat from drought and from saltwater intrusion into aquifers. The Bahamas and Barbados will be seriously affected as they are almost entirely dependent on groundwater supplies. The economic impact of climate change is expected to be significant: estimates show annual losses of $22 billion by 2050, equivalent to 10 percent of the current Caribbean economy. In addition, the region is challenged by the relative isolation of countries, small economies and insufficient financial resources, and low technical and institutional capacities. The vulnerability of the region and its islands has been starkly highlighted by the 2017 hurricane season, which has proved devastating to many countries.

Climate risk management and resilience are at the centre of UNDP support to Caribbean countries. Eight small island states are developing National Adaptation Plans and Nationally Appropriate Mitigation Actions, with technical assistance from UNDP. Countries are implementing mitigation and community-based adaptation measures at the local level in sectors vulnerable to climate change. Early warning systems are being expanded across the region based on a Common Alerting Protocol.

90%
population living in coastal areas

$22 billion
annual losses by economic impact of climate change by 2050

$16.1 billion
direct contribution of travel & tourism to GDP in 2014



Advancing Low Emission Climate-Resilient Development

Eight Caribbean countries are taking action to mitigate and adapt to climate change through the Japan-Caribbean Climate Change Partnership with UNDP and the Government of Japan: Belize, Dominica, Grenada, Guyana, Jamaica, Saint Lucia, Saint Vincent and the Grenadines, and Suriname. The initiative helps these countries to develop National Adaptation Plans and Nationally Appropriate Mitigation Actions and to implement related measures at the local level in economically critical sectors that are vulnerable to climate change. The initiative also strengthens knowledge networks and fosters South-South and North-South cooperation through sharing experiences and lessons learned.

A baseline assessment was one of the first actions undertaken by the Japan-Caribbean initiative, starting with a national consultation process in each country that set the stage for information collection. The assessments looked at the level of integration of climate change in national development policies, strategies and sector plans. The results have informed important adaptation and mitigation planning.

National training seminars are supporting the initiative's goals by building the capacity of public and private sector institutions, academia and financial institutions to design and implement climate actions. Seminars have been organized in six of the eight countries: Belize, Grenada, Guyana, Saint Lucia, Saint Vincent and the Grenadines, and Suriname. The process has helped to identify some priority interventions in each country. In Belize, for example, the modernization of the public transport sector was selected, in order to reduce emissions and support sustainable development.

Another important achievement in 2016 was the preparation of more than 40 community-based mitigation and adaptation projects in vulnerable sectors. This includes 10 projects that focus on water resource management; 21 projects that promote sustainable agriculture; five on community-based climate resilient infrastructure; and five with a focus on renewable energy and energy efficiency.

Early Warning Systems for the Eastern Caribbean

Barbados and Saint Lucia are working with UNDP to adopt better and faster early warning systems that can save lives in event of disaster. The key is the Common Alerting Protocol. This protocol is an internationally-recognized standard for automated notifications and alerts, operating from a centralized hub and able to disseminate the same message at the same time from a single point across multiple media including radio, television, email and public sirens. The system makes it possible to communicate early warnings simultaneously to populations at risk and to emergency response teams in different locations. This saves valuable time and expedites preparedness and response measures.

The current integration of Barbados and Saint Lucia brings the total network of CAP-based early warning systems in the region to 9. This expansion has been underway since 2011 supported by the European Commission and the UNDP sub-regional office in Barbados. The early warning systems can cover all natural hazards and man-made emergencies, and the warning advisories and methods can be customized and geographically targeted according to needs, enabling the "last mile" of the population to be reached.

Equipment to measure water level and water quantity in locations vulnerable to flooding has improved the capacity for monitoring and early warning. In 2016, the equipment provided nearly instantaneous data during the passage of Tropical Storm Matthew over St. Vincent and the Grenadines. Disaster management personnel immediately informed downstream communities about rainfall rates and water levels, which expedited the disaster response. This hazard surveillance equipment was provided by UNDP in collaboration with the Caribbean Institute for Meteorology and Hydrology.

The aim of the project is to establish an end-to-end early warning system in target countries and, ultimately, reduce the vulnerability of communities throughout the Caribbean. To inform future activities, a UNDP-supported review of this work will identify and document good practices in early warning systems across the region.

Community-Based Adaptation in Grenada

Fiberglass iceboxes, concrete tanks and rainwater cisterns are featured in community-based adaptation projects carried out by the Grenada Environment Division in cooperation with UNDP to increase the resilience of communities and ecosystems to climate change. Three islands in the country of Grenada – Grenada, Carriacou and Petite Martinique – are implementing adaptation strategies in key areas such as food security and agriculture, marine and coastal resources, education and awareness, water resources, forestry and disaster risk reduction. To finance these projects, a Community Climate Change Adaptation Fund was established and, as of 2017, the National Climate Change Committee has approved 29 projects for funding and implementation.

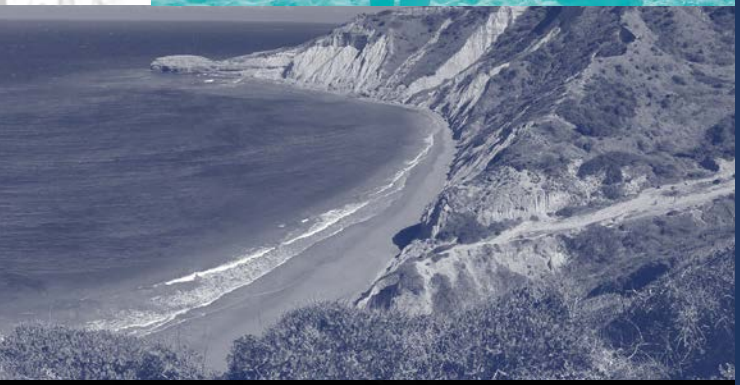
A typical example of this work is in Grenada's St. Andrew Parish, where increasing temperatures are causing the fish catch to deteriorate at a faster rate, lowering both quality and value and forcing many fishermen to fish the closer coral reefs rather than heading farther out where better catch is available. Damage is done to not only to livelihoods but also to coral reef habitats, which play a vital role in reducing the impact of weather events. The response: 30 durable fiberglass iceboxes were built and provided to fishermen. The fiberglass iceboxes allows for proper storage and cooling, allowing fishermen to venture out to high-value areas away from the coast, at once increasing livelihoods, protecting biodiversity and ensuring the natural coral reef remains a barrier to adverse weather events.

Grand Anse, one of the driest areas on Grenada, lacks irrigation systems and suffers frequent crop losses that increase food insecurity among local communities. Together with the Grenada School for Special Education, the project built a 20,000-gallon concrete tank to store water during the rainy season, as well as a drip irrigation system and a solar pump to facilitate gardening and agricultural production during the dry season.

Carriacou, one of the country's several islands, has no rivers and depends entirely on rainwater harvesting and storage to meet its water needs. In 2016, a women's group rehabilitated the local public cistern in Top Hill, where farmers now have back-up water for livestock and crops, and local tourism businesses such as guest houses, restaurants and hotels can meet their water needs.

Grenada is committed to strengthening public understanding and awareness of climate change risks and of successful adaptation measures in the country. The country has developed and launched a website as a knowledge management platform to disseminate climate-related information. It is also producing and distributed a series of 10 awareness-raising videos to showcase community-based adaptation projects.

The 29 community-based adaptation projects implemented in Grenada are helping to move the small island state closer to reaching its commitment to the Paris Agreement. Similarly, the Japan-Caribbean Climate Change Partnership is providing direct capacity building for the implementation of Nationally Determined Contributions to the Paris Agreement, by developing national adaptation and mitigation plans. For disaster risk reduction, a region-wide early warning system across the small islands of the Eastern Caribbean enables populations at risk to take preparedness measures and authorities to make decisions that can save lives and property, thus contributing to the Sendai Framework.



PROJECT INFORMATION

Project title: Programme on Integrated Climate Change Adaptation Strategies
Project period: 2013–2017
Implementing partners: Grenada Environment Division of the Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment
Funding partner: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
Total project investment: $3.2 million

Project title: Strengthening Resilience and Coping Capacities in the Caribbean Through Integrated Early Warning Systems
Project period: 2015–2017
Implementing partners: Caribbean Institute for Meteorology and Hydrology, International Federation of the Red Cross and Red Crescent Societies
Funding partner: European Commission Department of Humanitarian Aid and Civil Protection's Disaster Preparedness ECHO Programme (DIPECHO)
Total project investment: $809,748

Project title: Japan-Caribbean Climate Change Partnership
Project period: 2015–2018
Implementing partners: Caribbean Community Climate Change Centre, University of the West Indies
Funding partner: Government of Japan
Total project investment: $14.9 million

ARAB STATES

SUDAN

70% population dependent on crop production or livestock

62% energy is biomass

70% population with no access to electricity

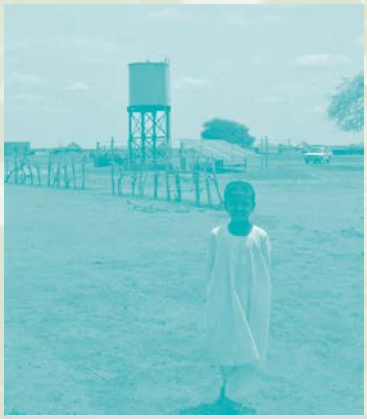
20% renewable energy emission pledge by 2030

Sudan is a country rich and diverse in natural resources, yet much of the land is arid and threatened by floods and chronic drought. Supplies of energy, water and food are limited, and extreme weather is a continual and major concern. Climate change projections point to expanding desertification, a decrease in average rainfall, and a rise in average temperatures. Together these pressures contribute to worsening tensions and clashes among population groups who compete over scarce resources. This comes in the context of significant conflict in past years, where much of the country is still rebuilding infrastructure and services. In 2016, UNDP continued its work alongside the Government to strengthen the resilience of the agriculture sector, improve weather and climate forecasting, and help the country to convert to clean renewable energy. This work contributes to long-term peace and security across Sudan.

Resilient Agriculture and Food Security

It is expected that climate change will intensify the ongoing process of desertification of Sudan's arable land and lower crop production significantly for millet and sorghum, which are the main staple food crops. The country's vulnerability to climate change is accentuated by the fact that over 70 percent of the population is dependent on crop production and/or livestock husbandry for their livelihoods. An agriculture-based economy, the sector employs 48 percent of the labour force and contributes 30 percent to the country's GDP. Further, the hardships caused by drought and other climate stressors underpin resource-based tensions among affected communities.

Given the importance of the agriculture sector on peace-building, livelihoods and overall development goals, it is one of three sectors prioritized under Sudan's National Adaptation Programme of Action.



UNDP has been working with the Ministry of Agriculture to reduce the vulnerability of small-scale farmers to food insecurity by demonstrating viable and cost-effective adaptation strategies, such as introducing crop varieties that are better able to withstand drought conditions, and efficient techniques to harvest rainwater. The strategies are being implemented in four zones vulnerable to climate change: Gedarif, North Kordofan, River Nile and South Darfur. The aim is to strengthen the resilience of at least 4,000 highly-vulnerable households. Through UNDP support, demonstration farms were established and thousands of farmers trained in soil conservation, agroforestry, intercropping and natural resource management practices. Farmers have established pilot farms on 142 hectares of land and planted nearly 50,000 multi-purpose trees. Improved forest and rangeland management have protected 710 hectares, and 28 shelterbelts were established with trees to protect farms from encroaching sand. To reduce farmers' vulnerability to drought, over 80 tonnes of improved crop seeds were distributed, such as drought-tolerant millet, cowpea and sorghum.

To reduce vulnerability to energy and water scarcity, the use of alternative energy methods and water harvesting techniques through terracing were also introduced, including use of butane gas stoves for cooking and solar pumps for wells used for drinking and small-scaled irrigation.

Women and Resilience

Women in Sudan are actively engaged in farming alongside men and children, and have also participated in demonstration farms and received support for cultivating home gardens. UNDP supports initiatives of direct benefit to women, especially to reduce the impact of climate stress and to strengthen adaptive capacity.

A revolving fund was set up to provide women with loans that help them run micro-enterprises, such as in trade and cookie production, or to obtain butane gas stoves. Women participated in training in community-based organization and management, bookkeeping, how to manage revolving funds, food processing and in manufacturing improved stoves. In one village, a Community Development Centre was established and a second centre was rehabilitated to house women's activities, such as bread-making training and women's group meetings. Among many benefits, the project helps to diversify women's livelihoods, providing alternative sources of income when future droughts occur and destroy crops.

Providing butane gas stoves has also benefited women directly, providing a cleaner source of cooking fuel and reducing the time they spend cooking and collecting fuelwood. The stoves also have a positive impact on women's health by eliminating the smoke produced by firewood. Some of the women now consider the stoves to be "the most essential service" provided by the project. Also, rehabilitating and constructing wells has had an equally beneficial impact on women by easing their workload and increasing access to water.

Better Weather and Climate Forecasting

Access to weather and climate information is critical to farmers as it helps them decide when best to sow or to avoid crop losses by switching crops if adverse weather conditions are in the forecast. Roughly 60 percent of rural households are dependent on traditional, rain-fed farming and pastoral practices – yet Sudan has a very limited capacity for hydro-meteorological monitoring or satellite imaging. This means that many important regions vulnerable to floods, drought and climate change are not monitored, leaving the population without access to basic weather or climate forecasts, early warning or information on potential climate change scenarios that could negatively affect their crops or livestock.

The lack of weather monitoring capacity increases uncertainty and the risk of losses. For this reason, financial service providers such as banks are discouraged from lending to farmers and livestock owners in these areas, and insurance is typically only available to wealthier farmers. Many small farming communities are unable to protect their crops and livestock from adverse weather, tending to suffer more losses and to resort to humanitarian assistance when droughts or floods occur.

UNDP is helping to address these problems in six states: Gedarif, Kassala, North Kordofan, River Nile, South Darfur and White Nile. The aim is to build the capacity of institutions such as Sudan's National Hydro Meteorological Service to monitor climate change, generate reliable hydro-meteorological information and seasonal forecasts, and provide early warnings and agricultural advisories. This will help communities plan ahead, reduce potential risks and mitigate losses. In 2016, project funds helped to introduce or update existing technologies in all six states, notably through the purchase and installation of agro-met stations with telemetry, 162 rain gauges, six automated weather stations, high-resolution remote sensing data, and hydrological modeling licenses for hydro-met software. Technical training helped local authorities to make use of software modeling and Cold Cloud Duration – a technique that uses satellite images to make rainfall estimates. This new infrastructure is now providing climate and rainfall readings for many farming communities.

UNDP is also helping to develop Sudan's first Weather Index Insurance – a type of insurance that allows weather-related risks to be insured for farmers who do not have access to traditional agricultural insurance. Plans are also underway to introduce credit facilities that will provide loans with flexible payment schedules for farmers and pastoralists. The loans will help them to purchase farming or livestock technologies that are better adapted to drought and other weather-related hazards.

Sustainable Solar Energy for Darfur

Sudan faces a critical energy supply situation. Biomass resources account for 62 percent of Sudan's energy supply, fossil fuels for 34 percent and the renewable sources such as hydropower for the rest. To complicate the situation, following the secession of South Sudan in 2011, the country lost 60 percent of its biomass energy resources, 75 percent of its oil reserves and 25 percent of its hydropower potential. Currently, according to the latest estimates available, 70 percent of the population in Sudan currently has no access to electricity and 92 percent use biomass for cooking. A shift to alternative, more sustainable, sources of energy is supported by UNDP and other United Nations agencies.

UNDP contributes to the recovery and reconstruction plan of the Darfur Regional Authority. Darfur is a region in western Sudan consisting of five states that are home to 8 million people, and still rebuilding from a decade of conflict that ended in 2011. A key project is the installation of solar photovoltaic systems in Darfur. The objective is to establish demonstration plots of affordable solar energy through PV lighting in public service areas such as streets, hospitals and clinics, municipal offices, women's centres, community centres, police stations and schools. The project will provide electricity to 70 villages, each of which will provide electricity to additional villages, reaching an estimated 40,000 households.

In 2016, when the initiative began, 70 village sites in Darfur were identified and their energy needs assessed to ensure the most appropriate solutions. As of mid-2017, the PV solar systems have been designed and technical assistance provided to create local capacities on their operation and maintenance. A training programme was introduced in local vocational training centres, and 50 village technicians were trained in installation, operation and maintenance. The training will ensure that the local population will be able to continue running the systems into the future.

The next step for UNDP and partners will be to scale-up the work. Preparations are underway to undertake a market demand study for solar PV as well as a feasibility study for solar water pumping. A plan is being developed to raise broader awareness among the population on the potential and benefits of renewable energy.

The introduction of solar systems and enhanced local adaptation is helping Sudan make progress against its commitments under the Paris Agreement, as one of Sudan's intended Nationally Determined Contributions on mitigation is to integrate renewable energy in the country's energy grid. In addition, enhanced energy access supports progress towards the Sustainable Development Goals. Enhancing Sudan's capacity to monitor climate change and to generate reliable hydro-meteorological information, seasonal forecasts, early warnings and agricultural advisories is in line with the Sendai Framework. Strengthening the role of women in climate adaptation and disaster risk reduction is advancing progress for women's empowerment.

PROJECT INFORMATION

Project title: Implementing Priority Adaptation Measures to Build Resilience of Rainfed Farmer and Pastoral Communities of Sudan, Especially Women Headed Households, to the Adverse Impacts of Climate Change
Project period: 2013–2016
Funding partner: Foreign Affairs, Trade and Development Canada (FATDC)
Total project investment: $2.8 million

Project title: Climate Risk Finance for Sustainable and Climate Resilient Rain-fed Farming and Pastoral Systems
Project period: 2014–2018
Funding partner: Global Environment Facility, Government of Sudan
Total project investment: $475,300,000

Project title: Darfur Solar Electrification Project
Project period: 2016–2017
Implementing partners: Darfur Regional Authority and the Ministry of Technology and Capacity Building
Funding partner: UNDP, UNIDO, UN–Habitat, WHO, Darfur Development and Reconstruction Agency (DRA), Ministry of Water Resources and Electricity (MWRE), National Energy Research Centre (NERC)
Total project investment: $5.7 million

LEBANON

90% refugee population hosted in 251 towns and villages

97% use of fossil fuel energy

12% renewable energy goal by 2020

1°C expected temperature increase on the coast by 2040

With higher temperatures and drier conditions anticipated due to climate change, forest fires and drought will likely increase in frequency and severity. These developments will have significant economic consequences for the country, especially in the water, energy and agriculture sectors. Since 2015, UNDP's work in Lebanon has shifted from a focus on disaster risk reduction to strengthening energy access, efficiency and the share of renewables and assisting the Government to meet its commitments under the Paris Agreement. At the same time, Lebanon faces a fragile security environment as a result of the crisis in neighbouring Syria and the large influx of Syrian displaced. UNDP promotes stability and recovery among displaced and host communities.

Solar Power for All

Lebanon has a deficit in electricity supply and power outages are common in rural areas, where they can last up to 18 hours. One important initiative is the ongoing installation of over 845 solar-powered streetlights in the Akkar region, which will cover approximately 50 villages with high poverty rates and large numbers of Syrian displaced. Lights are being installed in communal areas and village squares to improve security at night and provide electric lighting during blackouts. In addition, 2,358 solar kits benefiting over 11,700 persons, including both displaced and host communities, are being installed in impoverished homes, with the capacity to light three rooms.

At the institutional level, a solar photovoltaic systems. The system in the Jabal Amel Hospital in southern Lebanon will save the hospital about $37,000 annually and reduce greenhouse gas emissions by 160 tonnes per year. A similar solar system in the Orphan Welfare Society in Saida will reduce greenhouse gas emissions by 395 tonnes per year.

Given the continued Syrian refugee crisis, a national survey was done to assess the impact of refugees on electricity demand, with the goal of identifying the most suitable alternatives to increase the supply of, and access to, electricity, including recommendations for renewable energy options. The study identified a list of recommendations, both for infrastructure upgrades and the introduction of renewable sources into the electricity mix. This will help meet the additional 486MW of electricity required.

The Pivot to Renewable Energy Sources

The Government of Lebanon has set itself an ambitious target of securing 12 percent of energy needs from renewable sources by 2020. Currently, renewables account for 3 percent while fossil fuel imports make up 97 percent of energy requirements. To support Lebanon's energy objectives, UNDP and partners contributed to the development of the National Renewable Energy Action Plan 2016–2020 (NREAP). The plan paves the way for national actions needed to develop renewable energy in the country. In this regard, a study on hydropower potential from non-river sources determined the amount of energy that can be generated along the coastline from water that feeds back into the Mediterranean, from wastewater management plants and from drinking water. Another study considered the potential energy generation of five wastewater treatment plants.

In 2016, work was underway to establish nine power generation systems that combine solar energy on the national grid with existing diesel generators and battery storage. The systems will provide a reliable power supply and increase energy access for shortlisted facilities, such as NGOs and companies in the nine areas, while reducing the local energy requirements for fossil fuels and supporting the local solar market economy.

The village of Kabrikha is being converted into a model Low Carbon Village in Southern Lebanon in an effort to demonstrate the utility and benefits of renewables. Community-led solar power systems are being installed and synchronized with the village's diesel-based power generation system to later connect with the national electricity grid. The 250kWp photovoltaic system will benefit 450 rural households with 2,250 residents.

In addition to working with local, community-based organizations, this initiative is also helping to improve energy efficiency in public facilities and introduce renewable energy technologies. One example is the MEDRAR Medical Center where a ground source heat pump is being installed in the brand new facility along with an efficient design as maximize the system's performance. The 108MW system will have the capacity to heat, cool, and deliver hot water to the 240-bed facility, supporting at least 25,000 people per year.

Another example is the installation of a solar power plant at the USEK (Universite Saint Esprit de Kaslik) campus in Kaslik, making it the biggest solar project in an academic institution in Lebanon. The 212kWp system is expected to provide the campus an estimated energy yield of 300MWh per year and hence reduce the release of CO2 emissions by 213 tonnes.

Partnership with the private sector is promoting the conversion to renewable energy among Lebanese companies. A hybrid power system for LibanJus, a juice manufacturer, uses a 135kWp system that is estimated to generate 185MWh of electricity and save approximately 135,000 kg in CO2 emissions annually. Similar systems are being installed in 15 other facilities. These ongoing initiatives form part of a wider UNDP programme that has been under implementation since 2007 to support the country's energy access, efficiency and sustainability.

Reducing Greenhouse Gas from Transport and Waste Sectors

The Government of Lebanon is committed to reducing the country's greenhouse gas emissions (53 percent of which come from energy production) and meetings commitments under the Paris Agreement. One key step is the Government's development of Nationally Appropriate Mitigation Actions (NAMAs) across a number of sectors, including transport and waste.

Preparing the national climate change agenda in Lebanon involved the Council of Ministers, relevant government ministries, national stakeholders and international experts. A consultative process served to identify appropriate mitigation actions based on agreed criteria among the participating government bodies. The process led to the selection of five proposals to reduce greenhouse gases, two of which were finalized in 2016 – a proposal to promote fuel-efficient and hybrid vehicles and a national strategy to transform waste into energy. Other proposals have been accepted and are in the pipeline for development in the coming years (e.g. forestry, hydropower, energy-efficient buildings).

Strengthening Institutions for Climate Action

Lebanon prepared its Intended Nationally Determined Contribution in 2015 with UNDP support, identifying actions the country intends to take towards low emissions and climate resilient development. In 2016, UNDP focused on assisting the Government to develop a roadmap that identifies the national requirements expected under the Paris Agreement along with timeframes, gaps and needs of each sector and government ministry, and mechanisms to address these gaps. A higher-order of institutional arrangements was also prepared.

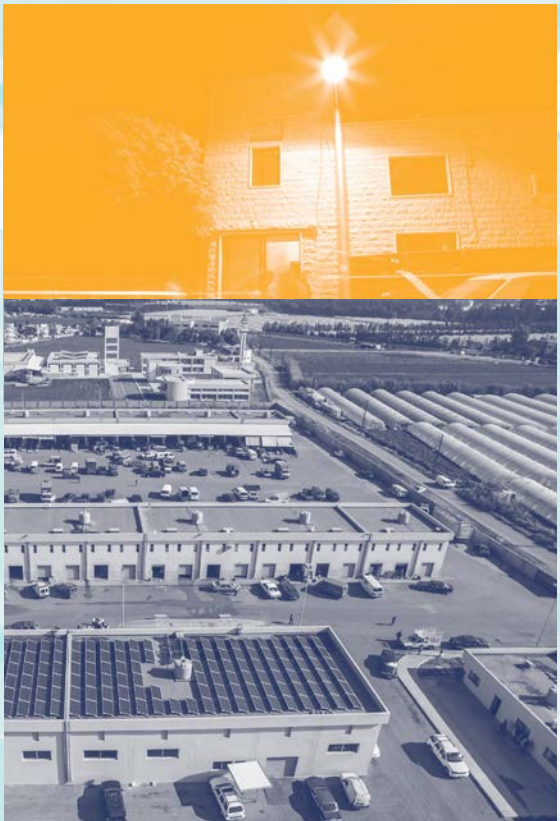
In other 2016 achievements, a draft law for Lebanon to ratify the Paris Agreement was prepared and submitted to the Council of Ministers, which approved the law; it now awaits final endorsement by Parliament. Key progress was made to initiate the Lebanon Climate Act, which private sector entities can voluntarily join to contribute to the agreed national targets. Also this year, 42 commercial institutions submitted their CO2 emission reporting documentation and received their certification from the Ministry of Environment, supporting the newly developed Greenhouse Gas Emission Inventory System. UNDP also supporting the Ministry of Finance to create a system that allows industries and commercial facilities to submit their greenhouse gas reports online while completing required annual tax declarations.

Stability and Recovery: Support to Refugees and their Hosts

UNDP's climate, disaster and energy work is undertaken in the context of an influx of refugees, 90 percent of whom are hosted in 251 towns and villages across the country. Within this group of refugees, 90 percent face food insecurity, 70 percent are living in poverty and more than half are unable to meet their basic needs. Despite the generous response of the Lebanese Government to support the refugees by providing them with shelter and basic services, demand for public services exceeds local capacities, which is also having a significant effect on Lebanese host communities.

Within the overall Lebanon Crisis Response Plan of the United Nations, UNDP leads and implements the Stabilization and Recovery Programme. In 2016, UNDP delivered over $50 million in assistance, providing support to local authorities on crisis management and rule of law, bringing training and equipment for municipal police, and promoting a culture of human rights. At national level, UNDP worked closely with the Government to professionalize the police force and judiciary and to build disaster preparedness institutions so that Lebanon can respond successfully to future crises. These initiatives ultimately contribute to the country's long-term peace and development. Over the next three years, the recovery programme will continue to develop resilient public institutions that will protect, assist and deliver services to vulnerable communities.

Under the 'Peace Building in Lebanon' project, UNDP continued to work with local leaders and heads of municipal councils to provide them with practical knowledge and skills on crisis management and conflict prevention. The project also continued to support schoolteachers, principals and students through its 'Violence Free Schools Initiative'. Also, the UNDP-supported Lebanon Host Communities Support Programme continued to promote local economic development and create sustainable employment opportunities. Launched in 2013, it has implemented over 460 projects in 120 locations, directly benefiting more than 1.1 million people, Lebanese and Syrian alike, and helping build a more stable and sustainable future for communities.



PROJECT INFORMATION

Project title: The Low Emission Capacity Building Project
Project period: 2012–2019
Implementing partners: Ministry of Environment
Funding partner: European Commission, Government of Germany, Government of Australia
Total project investment: $1.9 million

Project title: National Action Programme to Mainstream Climate Change into Lebanon's Development Agenda
Project period: 2013–2015
Implementing partners: Ministry of Environment, Ministry of Finance, National Council for the Environment
Funding partner: Lebanon Recovery Fund (a programme established at the Stockholm Conference and led by the Government)
Total project investment: $500,000

Project title: Supporting Lebanese Communities, Promoting Stabilization and Social Cohesion in Lebanon – Access to renewable energy applications in in host communities
Project period: 2014–2017
Implementing partners: Ministry of Energy and Water
Funding partner: The Netherlands
Total project investment: $4,076,250

Project title: CEDRO IV
Project period: 2014–2017
Implementing partner: Ministry of Energy and Water
Funding partner: European Union
Total project investment: EUR 3 million

Project title: Machrek Energy Development - Solar (MEDSOLAR)
Project period: January 2013 – June 2016
Implementing partner: Ministry of Energy and Water
Funding partner: ENPI CBC Mediterranean Seas Basin Joint Operational Programme, adopted by the European Commission
Total project investment: EUR 1 million (UNDP part)

SOMALIA

70% of livelihoods in agriculture, pastoralism / charcoal production

80% of the land area is arid or semi-arid

35,000 ha of land deforested for charcoal production each year

3,333 km of Africa's coastline (longest in Africa)

Severe drought in Somalia is causing large-scale crop failure, livestock deaths and malnutrition in the worst-affected areas. Over six million people are still in need of humanitarian assistance – half the country's population. Such natural hazards are not uncommon in the country, where 80 percent of the land area is arid and semi-arid. Land degradation, deforestation, loss of biodiversity and the impacts of climate change will only exacerbate pre-existing vulnerabilities – as will excessive reliance on charcoal and firewood as the main energy source. Years of conflict have crippled much of the country's infrastructure and services, and created one of the world's most complex and long-lasting crises.

In 2016, UNDP worked with the Government of Somalia on drought recovery efforts, projects that promote resilience to climate change, formulation of a Clean Energy Programme and development of a National Capacity Self-Assessment and Action Plan. Together, these efforts are helping to strengthen the coping capacities of some of Somalia's most vulnerable and at-risk communities.

Drought and Climate Resilience

Introducing adaptation know-how and technologies to Somali farmers and pastoralists is critical to food insecurity and reduced mortality and morbidity. As it is, subsistence agriculture, pastoralism, agro-pastoralism and charcoal production represent the principal livelihoods of 70 percent of Somalis, and livestock alone contributes some 40 percent to Somalia's GDP and more than 50 percent to its export earnings. UNDP is committed to strengthening national and local capacities to prevent and prepare for disasters, while adapting to the impacts of climate change.

In 2016, Somalia drafted its national Climate Change Policy to help guide the selection of priority adaptation measures and mobilize funding for mitigation. This is complemented by ongoing initiatives to develop model community-based adaptation strategies in agro-pastoral communities in Somaliland, Puntland and South Central zones, which are helping to build climate resilience across the country and over the longer-term. Measures include, for example, setting up Climate Monitoring and Early Warning Centres in Somaliland and Puntland; supporting agro-pastoral field schools to promote climate-sensitive practices; and assisting with the research and testing of drought-resistant crop varieties.

In some of the most drought-affected areas in Somalia, farming and pastoral communities have received assistance from UNDP to improve access to water. Water harvesting schemes using sub-surface water tanks have been introduced, as well as community wells and water-storage ponds that can be used for basic human and livestock needs. In 2016, two sand dams and three water diversion structures were built in Puntland, and feasibility studies were carried out to build more canals, boreholes and eight water diversion structures. In Somaliland, two earth dams and five water diversion structures are being constructed. An assessment identified 100 ha of land that will be used to promote afforestation and enhance fodder production.

Additionally, a total of 36,000 people living in vulnerable communities participated in training on adaptation and received support to improve sustainable fodder production, reforestation, water harvesting and small-scale business cooperatives. Eight Disaster Management and Contingency Plans were completed for north-west regions of the country.

Taken together, UNDP's work with the Government of Somalia is helping to strengthen the resilience of local communities while putting in place the measures – policy, legal and institutional – to ensure broad, comprehensive disaster risk reduction and climate change adaptation.

Tackling Environmental Degradation and Deforestation

Somalia's environmental challenges require urgent attention. Land degradation is especially serious in the north-east and north-west regions, both currently affected by drought, where the diminished carrying capacity of rangelands no longer support the feeding requirements of the animal populations. Likewise, increasing demand for charcoal in the country is contributing to deforestation and rangeland degradation. Recent decades have seen a significant loss of biodiversity and the long-term survival of several species is uncertain. The country has limited capacity to address these growing environmental stresses. For instance, there are currently no policies for sustainable forest management, watershed management or land-use management. In addition, national budget allocations to conservation expenditure and adaptation actions are negligible.

Access to Clean Energy for Somalis

In 2016, the Government of Somalia completed a National Capacity Self-Assessment and Action Plan with support from UNDP to inform environmentally sound and sustainable development in Somalia. The process began with establishing a team representing the Office of the Prime Minister, Office of Environment, Ministry of Agriculture and other key sector ministries. In parallel, the project undertook three stocktaking exercises to collect information relevant to biodiversity, climate change and land degradation, specifically around existing laws, regulations, policies, plans, strategies and projects. Building on this information, national consultations culminated in Somalia's National Capacity Self-Assessment and Action Plan, which includes actions to strengthen the policy and legislative frameworks that serve to legitimize, validate and reinforce conservation efforts.

With an Action Plan in place, steps were taken to strengthen the structures and mechanisms that are needed to operationalize policies and laws. Specific priority actions included establishing a fund for combatting desertification; promoting community-based small-scale technologies to mitigate land degradation; and providing technical training on how to develop climate models and calculate greenhouse gas emissions. The Government presented the Action Plan to donors in July 2016 to mobilize financial resources. UNDP will continue to support the process in 2017, particularly supporting the Government during implementation.

Somalia suffers from widespread lack of energy access, a situation linked to weak institutional systems, a near absence of international investment and ongoing conflict threatening infrastructure projects. Charcoal and firewood account for 80 to 90 percent of national energy needs. This excessive reliance on biomass is exhausting the country's forest resources; in turn, this diminishes the country's capacity to absorb carbon emissions and leads to land degradation with the threat of floods and landslides. Approximately 35,000 ha of land are deforested each year for charcoal production alone.

Despite challenges, the country has a large potential for clean energy solutions. In 2016, in partnership with the Ministry of Energy and Water, UNDP assisted with the initial development of a Clean Energy Programme for the country. The programme supports efforts to shift to clean and more efficient energy sources, and was developed on the basis of a Renewable Energy Readiness Assessment completed in Somalia in 2015 with UNDP support. This assessment presented the business case for replicating successful renewable energy projects, specifically solar power.

Solar power is already part of the plan in Somalia, though limited. After solar systems were installed in health centres and at the Ministry of Planning and International Cooperation, national and regional governments requested UNDP to replicate the initiative in other locations. There are now plans to promote small and medium enterprises to produce renewable energy products in collaboration with financial institutions in Somalia. The national programme follows the guidelines of the International Renewable Energy Agency and fulfills its prerequisites for financial support, which allows for a window of resources to implement clean energy initiatives.

Finally, in an effort to tackle the deforestation, UNDP, as part of a UN Joint Programme to ban illegal exports of charcoal from Somalia, is supporting the Government to enforce the ban, promote alternative sources of energy, reduce charcoal consumption, provide alternative livelihood options and promote reforestation and afforestation.

While significant challenges remain in Somalia on the energy front, the Government's efforts to address energy access and shift to more efficient and/or renewable energy sources are nonetheless opening a space for UNDP and partners to provide support. These efforts will help facilitate progress towards the Sustainable Development Goals reliant on energy access – such as education and healthcare – while also transitioning away from energy sources that exacerbate natural vulnerabilities and expose local populations to natural hazards.

Promoting Lasting Peace and Development

UNDP is helping to reduce levels of conflict across and between communities, particularly through efforts that reduce the impact of these challenges on existing tensions. By supporting the sustainable use and management of natural resources and ecosystems, UNDP is helping to reduce competition over scarce resources that often leads to clashes and conflict among competing communities. For example, UNDP is working work with Somali farmers and pastoralists in areas affected by drought and famine through the sharing of agricultural adaptation knowledge and technology. These efforts are part of a wider UNDP portfolio of strategic peace-building activities, which range from localized area-based projects that improve livelihood opportunities for the poorest segments of the Somali population, to efforts that strengthen governance and rule of law, which are very fragile in Somalia. For example, community-based policing pilot projects supported by UNDP are increasing trust in the protection services in Somalia and fostering greater security in society.

Measures to protect the environment, introduce new energy sources and promote wide-ranging adaptive techniques for agriculture are helping the country reduce the scale of conflict, cope with the changing climate, and reduce the risk of future food insecurity and famine. UNDP-supported projects are advancing progress on the Paris Agreement, the Sendai Framework and the Sustainable Developments Goals. The new Clean Energy Programme will help Somalia with its intended contribution to the Paris Agreement by tapping into and expanding the use of solar energy.

PROJECT INFORMATION

Project title: Enhancing Climate Resilience of the Vulnerable Communities and Ecosystems in Somalia
Project period: 2015–2018
Implementing partners: Office of the Prime Minister; Somaliland's Ministry of Environment and Rural Development; Puntland's Ministry of Environment, Wildlife and Tourism
Funding partner: European Union, GEF Least Developed Countries Fund, United Nations Office for Coordination of Humanitarian Affairs (OCHA), Government of Somalia
Total project investment: $72.82 million

Project title: National Capacity Self-Assessment for Global Environmental Management in Somalia
Project period: 2015–2017
Implementing partners: Environment Directorate, Office of the Prime Minister
Funding partner: Global Environment Facility, Government of Somalia
Total project investment: $270,000

Project title: Environment and Energy
Project period: 2014–2018
Implementing partners: Environment Directorate, Office of the Prime Minister
Funding partner: UNEP, OFID, Japan, Norway
Total project investment: $2.9 million

Project title: UN Joint Programme for Sustainable Charcoal Reduction and Alternative Livelihoods (PROSCAL)
Project period: 2016–2020
Funding partner: Sweden, Italy, European Union
Total project investment: $6.2 million

EUROPE

BOSNIA AND HERZEGOVINA

Bosnia and Herzegovina is a middle-income country struggling with natural hazards and the need for greater energy efficiency. In 2014, the worst national flood event in 120 years activated 3,000 landslides and caused inundation in one third of the country's territory, affecting over one million people. UNDP's support has sought to strengthen resilience while facilitating long-term recovery. In 2016, initiatives focused on empowering government authorities and communities with better knowledge and information on hazards, risks and vulnerabilities. UNDP also provided technological and engineering solutions that reduce risks, save lives and avoid economic losses, especially in the agriculture, water and energy sectors. Ultimately, these efforts place the country in a better position to address the extreme events likely to come with climate change, helping to move the country towards sustainable development through disaster risk reduction and resilience building.

2014
worst national flood event in 120 years

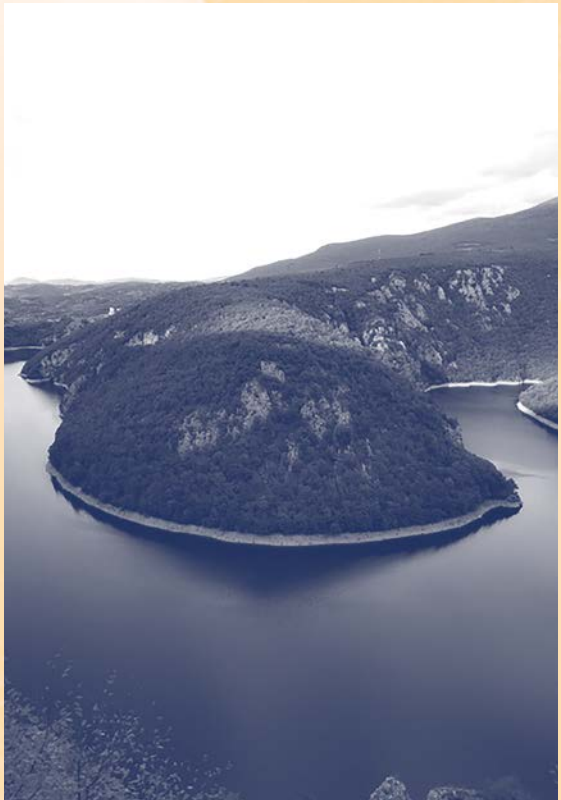
+1 million
people affected by flood (1/3 of the country)

1,800
landslides between 2011-14

23%
emissions reduction plan by 2030

Short- and Long-Term Recovery from Floods and Landslides

Following floods in 2014, UNDP provided immediate support to authorities to mobilize resources and to coordinate and deliver post-disaster recovery assistance. Between 2014 and 2016, numerous rehabilitation projects were completed, including the reconstruction of more than 4,600 homes, with priority given to the elderly, persons with disabilities, single-parent households, women and those in difficult economic circumstances. Communal infrastructure was also repaired, including 120 bridges and roads, and 31 water and sanitation facilities. This helped to re-open access to markets, schools, agricultural fields, health centres and other key services. To facilitate access to education, 168 schools were repaired to bring over 70,000 students back to school.



To assist local authorities to deliver public services, the project gave priority to the repair of municipal buildings and centres for social work, which benefited more than 226,000 people. Restoring economic activities was also a key element of the recovery process, and the project has helped to protect and create more than 5,600 jobs including re-starting agricultural production for 1,270 farmers.

Forecasting, Early Warning and Climate Change Modeling

One of the factors contributing to the 2014 disaster was the absence of warning systems and preparedness measures. UNDP works with local and national authorities to build their capacity in climate resilient flood risk management, specifically in the Vrbas River Basin. Representing 12 percent of the national territory, over half a million people live in the river basin, which is considered among the poorest and most vulnerable areas in the country. Roughly one third of residents depend on small-scale agriculture, producing fruit, vegetables and livestock. More frequent floods, likely given climate change, will have a significant impact on these livelihoods and on regional food security.

A flood risk management project – the first of its kind in Bosnia and Herzegovina – was undertaken with UNDP support to strengthen institutional and technological systems and enhance capacities. The country's institutional and legal framework on climate change and disaster risk reduction is weak, and sector plans do not always address these important challenges. In 2016, the existing legislative and institutional framework in the country was reviewed. This will help identify the most appropriate entry points for integrating and mainstreaming climate change and disaster risk reduction into regulatory and policy frameworks and key sector policies and plans.

UNDP also provided support to collect spatial and hydro-meteorological data and to prepare flood hazard and risk maps for the Vrbas river basin. These maps are based on hydrological modelling, which includes climate change models developed in line with IPCC scenarios and a 2D hydraulic model developed for the whole basin. A geoportal links spatial data with historical hydro-meteorological observations and socioeconomic information, and contains a database of flood damage. Work is underway to enable the direct transfer of real-time data into the forecasting platform, allowing policymakers, developers and other stakeholders to ensure evidence-based, risk-informed development planning. These actions resulted from an assessment undertaken to identify the main gaps and the solutions needed to improve existing flood early warning systems.

Through a related initiative, UNDP has helped to develop the Disaster Risk Analysis System, an integrated multi-hazard risk information management tool. The system is an online platform that houses valuable data and information about floods and landslides. The online platform contains data on flood and landslide hazards in the municipalities of Tuzla and Doboj, precipitation and water levels from Hydrometeorology and Water Agencies, as well as spatial data on infrastructure, land use and population demographics. Hazard maps can be projected onto Google maps, and overlaid with specific vulnerability data to inform prevention or response planning when needed. The tool promotes greater awareness of risks and vulnerabilities affecting local communities, and enables fast computer spatial risk assessments, which empowers communities and authorities with the necessary knowledge to take preventive actions. This tool will be scaled up to other municipalities in the country.

Finally, to accompany the digital and institutional support, assistance was given to establish a hydro-meteorological network in the Vrbas river basin. This consisted of 28 gauges (20 precipitation, two meteorological and six hydrological gauges) as well as training in how to monitor and operate the equipment. This network is a first in Bosnia and Herzegovina and allows for the automatic measuring of water levels and discharge, rainfall and other meteorological parameters in real time. Plans are underway to establish institutional arrangements for a national flood forecasting and early warning system.

Reducing the Risk of Landslides

Bosnia and Herzegovina is at significant risk of landslides, which can be both frequent and severe when the country suffers heavy rains and snowmelt. The country experienced more than 1,800 landslides from 2011 through 2013. Flooding in 2014, meanwhile, activated more than 3,000 landslides that destroyed roads and transportation systems and disrupted economic activities and humanitarian aid. Following the disaster, many settlements and infrastructure were left near landslide areas that could cause further destruction. In general, the major at-risk areas are not equipped with monitoring and warning systems, exposing local populations to the serious threat of landslides.

In response, UNDP has been supporting a project with local governments and communities in 13 municipalities to rehabilitate and stabilize 17 particularly at-risk locations. Efforts were based on extensive geological research, and work was undertaken to design the most appropriate structures or repair those that were distressed.

With UNDP support, training on landslide risk management was also delivered to target municipalities. The training enabled representatives of the municipalities to understand the methods for monitoring landslides, to conduct landslides stability analysis and to apply improved construction methods during the rehabilitation process. The training programme was adopted by Geological Institutes in Bosnia and Herzegovina for replication throughout the country.

Biomass for Energy Efficiency

With significant forest coverage, forest biomass and bioenergy can play an important role in the economy of Bosnia and Herzegovina. Currently, the use of wood is characterized by traditional, low-energy efficiency patterns, such as using it for fuel in individual household heating. The country's energy sector has insufficient private sector involvement and limited incentives for renewable energy projects.

Investments in new methodologies and technologies for energy are required in order to achieve the goals and commitments of the Paris Agreement, and to ensure energy access and efficiency for the population, in line with the Sustainable Development Goals.

Through UNDP's Biomass Energy for Employment and Energy Security project, efforts are underway to clarify and define policies around the use of biomass as an energy resource, as well as increase awareness and create a market for this product. The ultimate objectives are to increase energy access and security, improve energy efficiency, create jobs and livelihoods in the energy sector and usher in new partnerships that can help take this forward and grow the nascent sector. Overall, it is hoped that the initiative will reduce greenhouse gas emissions from the energy sector by three percent by 2030 (based on 1990 levels).

Thus far, the project has carried out baseline assessments of investments in new methodologies and technologies for energy emissions; conducted a cost/benefit analysis of biomass use and supply and demand in the Srebrenica region; supported the recovery operation in Srebrenica by ensuring that six elementary schools employed more fuel-efficient heating systems; established a biomass association to ensure standardization, coordination and cooperation; installed and provided training in the use of a biomass briquettes boiler; and raised awareness in communities with teachers in particular trained on the importance of sustainable energy practices.

Looking ahead, this initiative aims to support policy development around biomass use, specifically the use of wood biomass; improve the technologies and methodologies of wood biomass processing, thus bringing greenhouse gas emissions down further and improving energy efficiency even more; and improve forest governance mechanisms so as to ensure that biomass use does not endanger forest coverage. It also aims to boost the number of infrastructure projects that employ renewable energy sources, with a target of at least three infrastructure projects by 2018 and an additional six by 2020.

UNDP's support to Bosnia and Herzegovina focuses predominately on enhancing the governance arrangements that enable energy changes and improve disaster risk reduction and climate change adaptation. This has been coupled with more concrete efforts at community level, such as skills enhancement, technology transfer and demonstrations in order to put in place the tools needed for early warning, preparedness, risk-informed development planning and better use of natural resources for sustainable energy practices. This work supports progress in line with the Sendai Framework on better risk information and risk governance and commitments under the Paris Agreement.

PROJECT INFORMATION

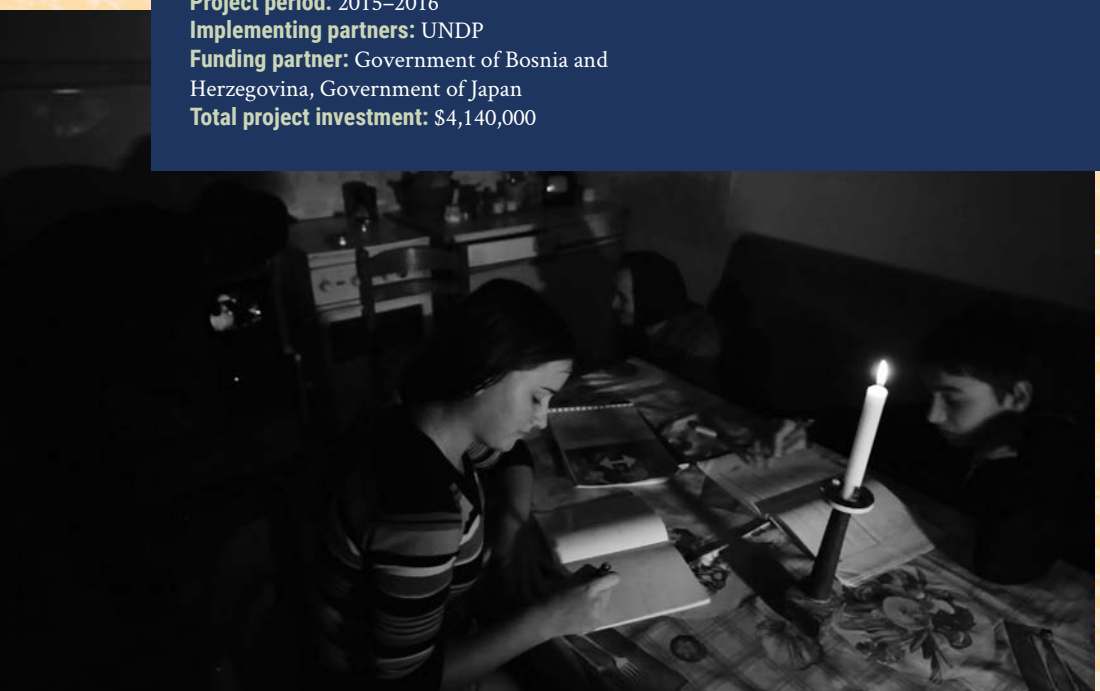
Project title: Floods Recovery Programme
Project period: 2014–2016
Implementing partners: UNDP, IOM, UNICEF
Funding partner: Council of Ministers of Bosnia and Herzegovina, Government of Republika Srpska, Government of Bosnia and Herzegovina, selected municipalities and cities
Funding partners: European Union, UNDP
Total project investment: Euros 43,520,000

Project title: Technology Transfer for Climate Resilient Flood Management in Vrbas River Basin
Project period: 2014–2018
Implementing partners: Bosnia and Herzegovina Ministry of Foreign Trade and Economic Relations; Republika Srpska Ministry of Spatial Planning, Civil Engineering and Ecology
Funding partner: Global Environment Facility, Government of Bosnia and Herzegovina
Total project investment: $5 million

Project title: Landslide Disaster Risk Management in Bosnia and Herzegovina
Project period: 2015–2016
Implementing partners: UNDP
Funding partner: Government of Bosnia and Herzegovina, Government of Japan
Total project investment: $4,140,000

Project title: Disaster Risk Reduction Analysis System
Project period: 2015–2016
Implementing partner: UNDP
Funding partner: Government of Turkey, UNDP
Total project investment: $130,000

Project title: Biomass Energy for Employment and Energy Security – Follow Up Project
Project period: 2016–2019
Implementing partner: The Embassy of the Czech Republic in Bosnia and Herzegovina, Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, Federal Ministry of Agriculture, Water Management and Forestry, Ministry of Agriculture, Forestry and Water Management of Republika Srpska, Department for Agriculture, Forestry and Water Management of Brcko District of BiH, United Nations Development Program (UNDP) in BiH
Funding partner: Government of Czechoslovakia
Total project investment: EUR 886,000



ARMENIA

17% GDP coming from crop and livestock production

46% population employed in crop and livestock production

36% electricity consumed in buildings

2050 year pledged to achieve ecosystem neutral emissions

Armenia is prone to earthquakes, drought, floods, mudslides and other natural hazards. UNDP support strengthens resilience and builds the country's capacity to manage these climate and disaster events. Local-level work helps rural communities adopt climate-resilient agricultural and resource management practices, including the introduction of drip irrigation and passive solar greenhouses. At the national level, UNDP supports the development of a National Disaster Risk Management Strategy and establishment of Crisis Management Centres. In addition, UNDP supports the Government's ambitious agenda to improve energy savings and efficiency, transition to renewables and meet its goals under the Paris Agreement. This work includes pilot demonstrations of energy-efficient public buildings and municipal lighting systems.

Climate Adaptation: Farming for a Sustainable Future

Agriculture is vulnerable to drought and other hazards yet is central to Armenia's economy. Crop and livestock production in Armenia contributes about 17 percent of the country's GDP and employs 46 percent of the population. UNDP supports action by the Government to reduce the impact of disasters and climate change on rural communities through a number of mitigation and adaptation measures.

An orchard once abandoned for lack of water now flourishes in Tavush, a region famous for its fruit. For years, local agricultural productivity and income have been hurt by droughts and land degradation. With UNDP support, farmers planted 1,400 trees on 1.6 hectares of mountainous terraces, using five different species of trees. These efforts demonstrate the benefits of an integrated approach: Supporting the orchard is also helping to conserve land quality and biodiversity; create livelihoods; maintain natural carbon sinks in forests; and support climate and disaster resilience by reducing the risk of soil erosion, landslides and flooding.

Drip irrigation systems in greenhouses are having a positive impact through efficient use of energy and water and also improved livelihoods, especially for women and girls growing organic vegetables for sale. One UNDP-supported effort has introduced drip irrigation systems in 26 family-size greenhouses are helping to decrease water use, which reduces the risk of crop loss due to dry conditions and water scarcity. A total of 4,160 linear metres of drip irrigation systems have been installed. The systems ensure water availability, protect soil quality and reduce the risk of erosion and landslides. Drip irrigation is used in dry regions because it is a water-efficient method that applies water at the roots where it is most needed to reduce runoff and evaporation. It typically uses one half to one quarter of the volume of water needed by other overhead-irrigation systems. When used on landslide-prone mountainous slopes, drip irrigation also reduces the risk of soil erosion.

Passive solar greenhouses constructed with straw bales and cement are not only energy-efficient but especially suited to mountainous regions. Another UNDP initiative in Tavush has installed 260 sq. metres of passive solar greenhouse space. The walls are built with local materials that ensure good thermal energy retention and an inflated double layer polyethylene cover is used to protect against wind, snow and hail. The passive solar design provides refrigeration without electricity, with storage used for preserving produce in a pest- and mold-free environment.

Drip irrigation, organic agriculture and passive solar design are helping to provide fresh vegetables year-round, enhancing women's economic inclusion and also building the resilience of communities to climate-related hazards and pests.

Other initiatives are reducing the risk of mudslides, such as placing enforcements along riverbank segments in the Vayots Dzor region, and rehabilitating vegetation in mudflow collection zones. Training courses have also helped to strengthen the capacity of 43 communities to manage climate change-related risks affecting local agricultural activities, helping extend the impact of this work far beyond the value of the initial investment.

Structural and institutional disaster risk management
Given Armenia's exposure to natural hazards, UNDP and the World Bank are supporting the Government on a series of institutional and structural disaster risk reduction measures. One foundational result is the creation of a National Disaster Risk Management Strategy. Developed in 2016, it is aligned with the Sendai Framework for Disaster Risk Reduction and with the Sustainable Development Goals.

Emergency response is also being improved. Ten regions across the country operate Crisis Management Centres established with UNDP support in partnership with the Ministry of Territorial Administration and the Ministry of Emergency Situations. These Centres have an improved information management system and a new communications service for emergency response. They form the central hub for disaster response and for coordination among the institutions responsible for disaster risk reduction in the country.

At the local level, UNDP and the Ministry of Emergency Situations have been working together to integrate disaster risk reduction into local development planning in several sectors. The partners have launched the "Community Risk Certificates" initiative to reward 100 target communities that successfully mainstream risk reduction into their local planning processes.

In the South Caucasus, schools will be better prepared when disaster strikes thanks to a programme introduced in 2016 with support from UNDP and partners. Funding is from the fourth phase of the area's DIPECHO programme, which has helped strengthen disaster preparedness in schools and targeted communities for seven years, working on evacuation drills, capacity building, public awareness, fire drills and other activities for disaster risk reduction. The programme, "Disaster Risk Reduction to Improve Resilience of Communities and Institutions in the South Caucasus", was launched by the Government with UNDP, the European Union, UNICEF, Oxfam, Save the Children and other partners. The aim is to develop local level resilience, with particular attention to women and children, through improving the ability of schools and pre-schools to react when disaster strikes. Steps are being taken to improve coordination amongst stakeholders to expedite response while improving disaster risk reduction more broadly.

Greening the Buildings

Given extremes in temperature in winter and summer, heating and cooling are necessary throughout most of the year in Armenia. Much of the urban housing stock is 30 to 60 years old and typically uses poor thermal insulation. Buildings account for 35.5 percent of electricity usage and over 25 percent of gas consumption in the country, largely to cover the heating load. The buildings sector is also the second-fastest growing sector, after transport, in terms of energy use and greenhouse gas emissions.

About 40 percent of the national energy saving potential is in buildings, providing impetus for a wide variety of initiatives to improve energy savings and efficiency by UNDP and the Government of Armenia. In a pilot project that promotes energy efficient designs for public buildings, five major public buildings have already been transformed with new energy-saving designs that improve their energy performance by 23 to 70 percent. In addition, technical advice has contributed to energy efficiency improvements for an additional eight large public buildings, where energy consumption for heating and ventilation has been reduced by 40 to 70 percent. Together these pilot demonstrations have directly reduced emissions of greenhouse gas by 53 kilotons and indirectly 1,294 kilotons. The focus on buildings remains particularly important because the sector offers the country's largest and most cost-effective opportunity to improve energy efficiency.

Green building designs for new buildings and retrofits for old are also promoted by UNDP in Armenia. Five different residential home designs that apply the principles of green architecture and renewable energy have been adopted by the Ministry of Urban Development and widely disseminated throughout the country. For existing buildings, eight new public sector projects will be implemented through fresh financing from the Green Climate Fund to scale-up investment in energy-efficient building retrofits, mobilized by the Government with support from UNDP.

Lighting the Cities

Greening urban lighting is another area of action, with nine pilot schemes implemented by the end of 2016 to improve energy efficiency in Alaverdi, a city that accounts for a large share of energy consumption in Armenia. A modern lighting system was installed along a nine-kilometre roadway that connects the Yerevan city centre with the airport, at the city's Zoological Garden and along several main streets. Together the nine pilot projects have contributed to annual energy savings equal to 983MWh and a reduction of greenhouse gas emissions of 436 tonnes of CO2 annually.

Efforts are ongoing to bring modern lighting systems to other locations, including interstate roads in Goris municipality connecting Iran to Armenia, several towns and villages in the Ararat Region, and in housing for low-income residents. A revolving fund will facilitate the replication of energy-efficient lighting projects in other municipalities, in response to the growing interest and demand in the country. Recently, the Ministry of Finance of Armenia and the Municipality of Yerevan signed an agreement to financially support a citywide street lighting project in Yerevan. This project will introduce new energy-efficient technologies for all municipal street lighting infrastructure.

Benefits to Armenia in energy savings and efficiency
A focus on greening urban lighting systems and public buildings not only improves energy performance and efficiency in Armenia, it also contributes to reducing greenhouse gas emissions and energy consumption. In so doing, these projects help the country to reach its intended national contribution to the Paris Agreement, namely to achieve ecosystem-neutral greenhouse gas emissions by reducing them to 2.07 tonnes per capita annually by 2050. In another area of work, UNDP-supported efforts to assist the Government of Armenia to mitigate the impact of climate change is helping to make agriculture more resilient, also one of the sectors prioritized by Armenia in its Paris Agreement commitments. Finally, the new National Disaster Risk Management Strategy positions the country to address the adverse impact of the multiple natural hazards. It contributes to the implementation of the Sendai Framework and, in the coming years, can be used as a benchmark to measure the country's progress in disaster risk reduction.

PROJECT INFORMATION

Project title: : Strengthening of National Disaster Risk Reduction Capacities
Project period: 2013–2016
Implementing partners: Ministry of Emergency Situations and National Platform for Disaster Risk Reduction
Funding partner: UNDP and Government of Armenia
Total project investment: $1 million

Project title: Mitigation of Climate Change Risks of Rural Communities through Improved Local Development Planning
Project period: 2013–2016
Funding partner: UNDP and Government of Armenia
Total project investment: $500,000

Project title: Climate Risk Mitigation: Passive Solar Greenhouse
Project period: 2016–2017
Funding partner: Government of Romania (RoAid) and "Toros" Consumer Cooperative

Project title: Green Urban Lighting
Project period: 2013–2017
Implementing partner: Ministry of Nature Protection
Funding partner: GEF and Government of Armenia
Total project investment: $1.6 million

ACRONYMS

SDGs	Sustainable Development Goals
UNDP	United Nations Development Programme
NDC	Nationally Determined Contribution
DRR	Disaster Risk Reduction
GPP	Global Preparedness Partnership
PDNA	Post-Disaster Needs Assessment
CADRI	Capacity for Disaster Reduction Initiative
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
NAMAs	Nationally Appropriate Mitigation Actions
CRGE	The Climate-Resilient Green Economy (initiative in Ethiopia)
REDD+	Reducing Emissions From Deforestation and Forest Degradation
GDP	Gross Domestic Product
FAO	Food and Agricultural Organization at the United Nations
NFSDP	National Forest Sector Development Programme (Ethiopia)
MIDIMAR	Ministry of Disaster Management and Refugee Affairs (Rwanda)
CCBAP	Cambodia Community Based Adaption Programme
FCPF	Forest Carbon Partnership Facility
GEF	Global Environment Facility
LDCF	Least Developed Countries Fund
LED	Light Emitting Diodes
NDMC	National Disaster Management Centre
DRM	Disaster Risk Management
GLOF	Glacial Lake Outburst Flood
NDMA	National Disaster Management Authority
CERF	Central Emergency Response Fund
DFAT	Department of Foreign Affairs and Trade (Australia)
IOM	International Organization for Migration
AAR	After Action Review
CCB	Community Capacity Building
PPP	Public Private Partnership
R2R	Ridge to Reef (project, Fiji)
ProPa	Protection in the Pacific (network, Fiji)
FRDP	Framework for Resilient Development in the Pacific (Fiji)
FBDRC	Fiji Business Disaster Resilience Council
RRMC	Risk Reduction Management Centres
SIDS	Small Island Developing States
PV	Photovoltaic
NREAP	National Renewable Energy Action Plan (Lebanon)

PHOTOGRAPHY

A special thank you to UNDP Country Offices in Armenia, Bosnia and Herzegovinia, Cambodia, Cuba, Ecuador, Ethiopia, Fiji, Lebanon, Malawi, Maldives, Nepal, Pakistan, Rwanda, Somalia, and Sudan for photos. Appreciation also for photos provided by Regional Offices and the UNDP Climate Change Adaptation Team.

Special thanks to the following photographers:

Jayson Edwards, Juliet Morton, Dean Petty, Jayvion Campos, Beau Simpson, Kyson Hanna, Roderick Wilson, Aldo Murphy, Sylvia Stephenson, Parker Copeland, Jerome Whitney, Curtis Vaughan, Angelina Cameron, Kenneth Sampson, Khloe Abbott, Kaden Owen, Kamari Stevens, Kadence Le, Emmalee Yoder, Luna Benton, Spencer Brown, Bridger Mcintyre, Genesis Hutchinson, Angel King, Scarlet Green, Roger Burnett, Angelo Gibbs, Giovani Reese, Beatrice Levy, Kaitlynn Meyers, Glenn Wright, Cristopher Peterson, Tanner Klein, Arthur Stout, Milo Moon, Jamir Steele, Eddie Salinas, Jack Lowe, Hugo Hebert, Sawyer Joyce, Abdullah Walter, Efrain Esparza, Jane Little, Victoria Norris, Carlee Mcmillan, Adolfo Bean, Baron Charles, Elena Richardson, Keegan Cowan, Niko Rios, Damon Ho, Mary Mcmahon, Alanna Golden, Kayden Sellers, Dallas Armstrong, Dale Diaz, Kyra Montgomery, Nolan Roy, Teagan Mora, Janiya Freeman, Virginia Evans, Damarion Phelps, Liberty Turner, Rayan Carr, Reece Reilly, Rex Moss, David Becker, Tristen Christian, and Zain Chan.

PARTNERSHIPS IN ACTION

National Climate Plans for the Paris Agreement

Nearly 40 countries around the world are working with UNDP through a strategic programme to advance implementation of Nationally Determined Contributions (NDCs) under the Paris Agreement. The good practices and lessons emerging from this work are amplified by a number of key partnerships:

NDC Partnership, a global initiative launched to advance climate ambition and sustainable development;

International Climate Initiative's NDC Support Cluster, a collaborative effort under the German Ministry of Environment to advance NDCs;

LEDS Global Partnership, a partnership to advance thinking on long-term low-emission development planning; and

Partnership on Transparency in the Paris Agreement, a partnership that aims to identify good practices for NDCs.

Additionally, UNDP and the United Nations Framework Convention on Climate Change have spearheaded a series of global and regional technical dialogues to advance thinking on NDC design and implementation. UNDP and partners have held three global workshops on intended NDCs since 2015 with over 500 participants as well as 13 regional dialogues since 2014 with over 1,000 participants.

The '5-10-50' Partnership Initiative for Risk-Informed Development

The '5-10-50' Partnership Initiative is a global programme in support of country efforts to reduce the risk of disasters. The aim is to deliver risk-informed development through a comprehensive range of services in five interconnected work streams over 10 years in 50 countries, supported by the United Nations and other international partners (FA0, GNDR, IFRC, ODI, UNDP, UNEP, UNICEF, UNISDR, UNV, WFP and the World Bank's GFDRR). The goal of the initiative is for countries most at risk from disasters and climate change to have in place coherent public policies and systems that reduce existing risks, prevent the generation of new risks, and efficiently address the impacts from geo-physical and climate-related hazards. Through improved coordination and alignment of their programmatic portfolios on DRR and climate adaptation at the country level, the initiative aims to enhance efforts of developing country partners to deliver on their commitments to the four priorities of action of the Sendai Framework and contribute to the Sustainable Development Goals.

The five thematic work streams focus on actionable risk information, integrated risk governance, early warning and preparedness, resilient recovery and local action. The global work stream addresses national baselines, results reporting, research and advocacy. Work at this level will help establish global and regional policy interconnections, inform the development of a comprehensive approach at the country level, and influence the alignment of partners' existing programmatic interventions at national and local levels. The initiative's 50 high-risk countries were selected based on an analysis of 154 countries against three engagement principles: susceptibility to the impact of disasters, climate vulnerability and DRR enabling environment. The list will be finalized in consultation with UN Member States based on their interest.

Tripartite Agreement on Disaster Recovery

UNDP (representing the UN system) along with the World Bank and European Union have worked together to develop the *Post-Disaster Needs Assessment* (PDNA) methodology and the *Guide to Disaster Recovery Framework*. The PDNA has become a globally-accepted tool for assessing post-disaster recovery needs. Since 2008, at least 50 joint PDNAs and joint capacity development initiatives have been undertaken in multiple countries, including training of representatives of governments and inter-regional organizations in PDNA and recovery planning. By working closely together, the partners have succeeded in providing coordinated and coherent support to governments for assessing recovery needs and planning recovery operations. This collaboration also has the benefit of expanding the pool of technical expertise available to national governments and facilitating timely provision of this expertise. It has helped create tools, guidelines, training packages and other knowledge products that enriched by the partners' diverse experience that will provide coherent and uniform guidance to national governments and practitioners.

Legislation for Disaster Risk Management

Since 2012, UNDP and International Federation of the Red Cross and Red Crescent (IFRC) have partnered to assess and improve laws for disaster risk reduction. The world's largest comparative study of disaster risk management legislation was carried out by the partnership, resulting in the launch of a publication titled *Effective Law and Regulation for Disaster Risk Reduction: A Multi-Country Report* (2014). The study covered 31 countries and focused on dedicated disaster risk management laws as well as sectoral laws and regulations on environment, building codes and spatial planning. The research findings and insights gained from comprehensive stakeholder consultations contributed to the development of another resource, the *Checklist and Handbook on Law* and DRR. UNDP and IFRC have also co-hosted a law course since 2014, the *Annual Short Course on Law, Legal Protection and Disasters*, with the International Institute for Humanitarian Law. The course provides an introduction to international standards and legal issues in domestic and international disaster response, DRR and climate change adaptation.

Global Preparedness Partnership

The Global Preparedness Partnership (GPP) helps countries prepare for future disasters. It was launched at the World Humanitarian Summit in 2016. With national governments leading the way, the GPP provides support to save lives, time and resources when disaster strikes through focused, coherent, coordinated disaster preparedness. This also reduces impact to livelihoods and enables rapid transition to recovery. The GPP is led by the Vulnerable Twenty (V20) Group of Climate Ministers of Finance of the Climate Vulnerable Forum with a number of United Nations agencies (FAO, UN OCHA, UNDP, WFP and the World Bank's GFDRR). With governments in charge of the process at the national level, the GPP enables partners to align objectives and resources, agree on interventions and develop synergies to achieve more than they would individually. Additional partners currently include CADRI, GNDR, IFRC, UNISDR and UNOPS.

Insurance Development Forum

The Insurance Development Forum (IDF) is a major public private partnership between the insurance industry and public sector to optimize and extend the use of insurance and its related risk management capabilities to build greater resilience and protection for people, communities, businesses and public institutions that are vulnerable to disasters and their associated economic shocks. Launched at the Paris climate summit in 2015 (COP21), and built on a growing partnership between the industry and development community, the IDF is chaired by the industry and co-chaired by UNDP and the World Bank. The first significant outcome of the IDF is funding from the Governments of Germany and the United Kingdom for a range of insurance-related development initiatives, connected in part to the G7 'insuResilience' initiative to increase access to insurance coverage for the poor and vulnerable.

Capacity for Disaster Reduction Initiative

The Capacity for Disaster Reduction Initiative (CADRI) is a global partnership composed of 13 UN and non-UN organizations that works towards strengthening countries' capacities to prevent, manage and recover from the impact of disasters. The CADRI Partnership draws upon the diversity of expertise of its members to offers a unique combination of knowledge, experience and resources to support countries to implement the Sendai Framework for Disaster Risk Reduction. Financed by its members, CADRI delivers a range of risk-reduction capacity support at global, regional and national levels. Currently, CADRI is actively scaling up its support to respond to increasing country demands, as well as turning its attention to supporting of the Sustainable Development Goals through helping countries ensure their development is risk-informed.

Get Airports Ready for Disasters

The Get Airports Ready for Disasters (GARD) initiative is a public private partnership between UNDP and Deutsche Post DHL Group that aims to strengthen airport facilities and personnel capacities to better manage disasters when they strike. The project achieves this through developing relief surge capacity, training airport and related staff on a range of preparedness activities, and enabling local disaster relief agencies to better plan and coordinate relief efforts. The GARD programme builds upon the joint expertise and inputs of both organizations, specifically Deutsche Post DHL Group's expertise in logistics management and past experience in international relief, combined with UNDP's competencies in DRR and pre-existing partnerships with national governments. The partnership with local governments has ensured that the training is well-received and sustained in the country through linkages with ongoing programmes related to climate and disaster risks. Since the development of GARD in 2009, the project has been implemented in 41 airports across 18 countries, training more than 800 airport staff. The GARD initiative has been supported and funded by the Government of Germany since 2013.

RESILIENT
Zero-Carbon, Risk-Informed, Sustainable.

UNDP Climate Change
& Disaster Risk Reduction Team

Design by
In-House International (weareinhouse.com)

Art Direction
Lope Gutierrez-Ruiz,
Alexander Wright at In-House International

Senior Designer
Alexander Wright at In-House International

Typefaces
Crimson Text by Sebastian Kosch
Roboto Condensed by Christian Robertson

Printed by
Influence Graphics (influencegraphics.com)