

Adaptation IN ACTION

FAO's work in climate change adaptation



Food security and CLIMATE CHANGE

FAO's vision for the future is a **world free of hunger** and malnutrition where food and agriculture improve the living standards of all people. To make this vision a reality, **food production must increase** to feed a rising global population – a population expected to grow from **6.7 billion to more than 9 billion** in the next 40 years.

Developing countries are most in need of this increased food production, since these nations are home to some of the world's least food secure people who are also the most vulnerable to climate change impacts.



Adaptation IN ACTION

FAO is a global leader in climate change analysis, support and solutions. As a lead specialized agency of the United Nations (UN), FAO promotes agricultural practices that:

- enhance food access and nutrition

FOOD SECURITY

- increase resilience to climate change

ADAPTATION

- reduce or remove greenhouse gases

MITIGATION.

FAO-Adapt consolidates FAO's multi-disciplinary expertise on climate change adaptation. Through this Organization-wide framework, FAO provides countries with best practices, key principles and priority themes on which member nations can focus adaptation efforts in agriculture and food security.

Since launching FAO-Adapt in June 2011, the Organization has: developed and implemented new, adaptation-focused projects and programmes; and enhanced FAO's own capacity to deliver adaptation support to member countries.

FAO-Adapt also promotes synergies between adaptation, mitigation and sustainable development activities. As additional needs emerge, FAO-Adapt will continue to evolve in order to best leverage the Organization's climate change expertise.

CORE PRINCIPLES

FAO-Adapt is rooted in nine core principles. These principles guide FAO's work on climate change adaptation in agriculture, forestry and fisheries.

- 1 REDUCE CLIMATE CHANGE VULNERABILITY**
Vulnerability to climate change threatens food security around the world. Rural communities and impoverished groups are often hit hardest. Reducing climate change vulnerability is essential to fighting extreme poverty and hunger. Adaptation efforts must also support environmental sustainability, which is essential to achieving food security and alleviating poverty in the long term.
- 2 MAINSTREAM CLIMATE CHANGE INTO DEVELOPMENT PLANNING**
Adaptation must be integrated into overarching developmental support. Integrating adaptation into development planning translates into far-reaching benefits and plugs into holistic, climate change approaches.
- 3 SUPPORT COUNTRY-DRIVEN PROCESSES**
Climate change adaptation must be driven by the specific needs of individual countries.
- 4 BUILD SYNERGIES BETWEEN ADAPTATION AND MITIGATION**
Dealing with climate change means developing comprehensive solutions that: link adaptation and mitigation; and combine strategic, policy, institutional and technical options.



5 PROMOTE AN ECOSYSTEM APPROACH

Food production must be considered in parallel with: ecosystem capacity and resilience; equity in access to resources; and integration of sectors that use common resources.

6 DESIGN PARTICIPATORY, GENDER-SENSITIVE AND LOCATION-SPECIFIC ACTIVITIES

Adaptation is people-centric. In order to see benefits, efforts must be based on local contexts and rooted in equitable and participatory approaches.

7 DELIVER THROUGH PARTNERSHIPS

Climate change adaptation is a global issue requiring committed partnerships. Member countries, UN agencies, national and international research and financing institutions, bilateral donors, civil society organizations and the private sector must work together to support adaptation.

8 SUPPORT INTERNATIONAL, REGIONAL AND NATIONAL COLLABORATION

Climate change increases global resource interdependence. Managing shared resources collaboratively is therefore essential.

9 DEVELOP A LONG-TERM PROGRAMMATIC APPROACH

Adaptation efforts must be streamlined into priority themes and actions to ensure consistent, long-term progress.

FAO'S WORK ON CLIMATE CHANGE ADAPTATION

PRIORITY THEMES FOR CLIMATE CHANGE ADAPTATION

FAO-Adapt consolidates five global priority themes and related actions that support global adaptation needs in the agriculture, forestry and fisheries sectors.

Data and knowledge for impact and vulnerability assessment and adaptation

1



Institutions, policies and financing to strengthen capacities for adaptation

2



Sustainable and climate-smart management of land, water and biodiversity

3



Technologies, practices and processes for adaptation

4



Disaster risk management

5





DATA AND KNOWLEDGE FOR IMPACT AND VULNERABILITY ASSESSMENT AND ADAPTATION

To help countries deal with vulnerabilities to climate change, FAO works with decision makers to design new ways of assessing vulnerabilities; and planning adaptation strategies.

FAO helps countries put climate information into practice, emphasizing information-sharing to encourage member countries' participation in and ownership of adaptation actions.

Information Products for Nile Basin Water Resources Management

Implementation period: 2004–2011

Rapid population growth and natural resource degradation in the Nile River Basin mean more and more people risk going hungry.

- Current population: 200 million people
- Expected increase: 80 percent by 2030

Agriculture already uses more than 80 percent of renewable water resources in the Nile basin. Options to increase the water supply (e.g. draining wetlands or reducing evaporation in resources) are extremely limited. Managing these pressures requires innovative and strategic development planning.

FAO's "Information Products for Nile Basin Water Resource Management" project has been part of the answer. Through the project, FAO provided planning and decision-making tools that helped authorities:

- establish modern hydrological monitoring and reporting systems across the Basin;
- harmonize data-gathering;
- produce comprehensive surveys on water use and agricultural production;
- forecast the region's future food requirements; and
- analyse possible scenarios for water management and agriculture development.

FAONile

Through the project, geographic data on water, land and agriculture helped create the Nile Decision Support Tool (Nile-DST), an intricate software package that models the entire Nile system. Nile-DST allows planners to assess the consequences of various development scenarios. FAO also developed and disseminated technical manuals on water measurement techniques and technologies.

Project efforts have led to several hundred staff members being trained in water management and agriculture agencies. This group is now equipped with the knowledge, skills and tools necessary to manage the area's present and future water resources.



INSTITUTIONS, POLICIES AND FINANCING TO STRENGTHEN CAPACITIES FOR ADAPTATION

Climate change impacts are uncertain. Institutional arrangements need to be flexible if climate change adaptation is going to have a chance to work. FAO-Adapt accesses FAO's wide-ranging expertise to find adaptation solutions not only in agriculture, but also in forestry and fisheries. Moreover, FAO has been working to ensure community-based approaches are integrated into adaptation strategies.

Gender-sensitive strategies for climate change adaptation

Report published 2010; training package launched 2012

In the Indian State of Andhra Pradesh, some 83 million people – about two-thirds of the population – rely on agriculture for their livelihood. These farmers face daunting odds, including:

- low income
- limited employment opportunities
- environmental degradation; and
- societal challenges.

Moreover, many areas are highly susceptible to drought. The delayed monsoons of 2008 and 2009 had catastrophic repercussions on food security. Households unable to change their farming practices faced starvation. Given the growing unpredictability of climate change, this situation is likely to repeat itself with devastating results. Short-term coping strategies are no longer enough. Agricultural adaptation is a crucial response.



Paving the way toward an answer, FAO conducted a detailed study that considered how coping strategies are shaped by gender-specific power relations, including access to resources and equity in decision-making. By demonstrating men's and women's varying abilities to react to unexpected weather conditions, the study points to the mechanisms that need to be in place to facilitate longer-term climate change adaptation.

Through climate analysis, focus group discussions, key interviews and a survey of over 300 male and female farmers, the FAO study showed men and women farmers made significantly different use of the institutional support available. Moreover, women appeared to have less access to information than men.

To ensure that all adaptation efforts are sensitized to this disparity, FAO worked with the Consultative Group on International Agricultural Research (CGIAR) to develop a groundbreaking training package. This package can now be used to raise awareness of gender differences as related to climate change to help women and men better adapt to varying climatic conditions.

www.fao.org/climatechange/54818
www.fao.org/climatechange/micca/gender



The Global Partnership for Climate, Fisheries and Aquaculture Since 2009

Oceans represent the world's largest long-term sink for carbon. Globally, fish is the primary source of protein for 17% of the population. Moreover, aquaculture is the world's fastest growing food production system, growing at 7 percent each year. In order to sustain the crucial role of fisheries and aquaculture in the face of climate change, FAO is working with 23 other international organizations through the Global Partnership for Climate, Fisheries and Aquaculture (PaCFA). A worldwide, voluntary initiative, PaCFA engages in raising awareness of the crucial role of the sector in climate change adaptation and mitigation, developing effective tools and management approaches to address them, and building international development support to implement change and bring about lasting positive outcomes. FAO has been leveraging its technical expertise alongside other PaCFA partners in international efforts and fora to advocate for fisheries and aquaculture, including an emphasis on investment to build resilience in the sector.



**Global Partnership Climate,
Fisheries and Aquaculture**





Enhanced Climate Change Adaptation Capacity of Communities in the Mountain Ecosystems in Northern Viet Nam

Implementation period: 2010 – 2012

Remote, risk-prone communities dependent on agriculture are particularly vulnerable to the impacts of climate change. Through this One-UN project, FAO successfully established community-based adaptation as an institutional learning process for several risk-prone areas in Viet Nam. FAO worked with the Ministry of Agriculture and Rural Development to bring farmers, extension workers, local government officials and researchers closer together.

FAO trained 50 government officials at provincial and district levels in improved seed production, inspection and sampling techniques. FAO equipped the national testing laboratory up to the latest technical standards and trained laboratory staff to provide farmers with better seed varieties. FAO also built farmer group capacities in:

- advanced cultivation practices for the production of drought- and water-inundation-resistant crops; and
- improved methodologies for coping with the steep mountain terrain.

Alongside these new technologies, FAO also instructed farmers in traditional crop maintenance and storage methods.

To improve disaster risk management in these communities, FAO wove together short-term disaster risk reduction measures with longer-term adaptation priorities in the sectoral planning process at province level. With FAO support, provincial authorities improved their early warning systems by integrating weather and climate information into risk management and adaptation models. FAO helped back up the theory by testing and verifying in the field the resulting risk and vulnerability assessment maps, which were based on standardized indicators of vulnerability relevant to food security. FAO tested successfully more than 15 good practice options for climate change adaptation in 12 communities with different agro-ecological and socio-cultural settings. The project also engaged strongly with women's groups. Even after project completion local stakeholders have remained highly committed to continuing and replicating FAO's approach throughout the region.

www.fao.org/climatechange/76991/en

3

SUSTAINABLE AND CLIMATE-SMART MANAGEMENT OF LAND, WATER AND BIODIVERSITY



Sustainable and adaptive natural resources management can be critical to climate change adaptation. For this reason, FAO fosters land-use planning, soil and water management and biodiversity conservation. FAO has been spearheading efforts to monitor natural resource and biodiversity trends, integrate biodiversity into policy and promote tools and incentives that encourage the climate-smart management of land, water and biodiversity. Specifically FAO has been promoting conservation agriculture, which helps farmers achieve significantly larger yields with relatively fewer means.

Conservation Agriculture in Southern Africa: Zimbabwe and Lesotho Since 2000

12

In the drier areas of southern Africa, farmers experience drought once every 2 to 3 years. FAO promotes conservation agriculture because it offers climate change adaptation and mitigation solutions while reducing smallholder farmers' vulnerability to drought and soil degradation through the intensification of sustainable production. Applying conservation agriculture techniques can help maintain soil nutrition through organic mulches and crop rotations and by minimizing mechanical soil disturbance. About 8 percent of global arable cropland is currently engaged in conservation agriculture systems.

In 2004, FAO led the drafting of a conservation farming strategy for Zimbabwe, which in turn led to the creation of the Zimbabwean Conservation Agriculture Task Force. By implanting FAO-inspired, conservation agriculture methods, the Task Force had substantial success in the country. From 2004 to 2008 average cereal yields increased by 50-200 percent for over 40 000 farming households. Rather than simply handing free seed and fertilizer inputs to farmers, teaching conservation agriculture principles have enabled Zimbabwean farmers to use water, fertilizer and seed more efficiently.

Similar successes are also evident in Lesotho, where FAO has been promoting conservation agriculture since 2000. FAO support has helped make effective techniques popular among farmers. One such technique, which is called *likoti* and involves crop rotation and intercropping in small, untilled, mulch-fertilized pits, saw farmers in the Qacha's Nek district harvest more than three times the average yield for the 2006 growing season. In both 2007 and 2008, some *likoti* farmers who had adopted conservation agriculture not only produced enough maize for themselves; they produced excess grain that they sold to the World Food Programme for profit.

www.icrisat.org/journal/Volume6/aes/Twomlow.pdf
www.fao.org/docrep/012/i1650e/i1650e00.pdf



The Chinchiná Watershed Forestry Project, Colombia Since 2001

The Nevado del Ruiz tropical glacier that dominates the Chinchiná region in the Colombian Andes has lost almost 40 percent of its ice cap since 1970 due to climate change. This trend shows no signs of slowing. A complete loss of the Ruiz glacier would seriously harm local water systems. Additionally, uncontrolled deforestation caused by the two centuries of rapid agriculture expansion (chiefly coffee monoculture and cattle grazing) continues to threaten the biodiversity of the area and the integrity of its water resources.

Responding to the urgent need to respond to climate change impacts on the delicate watershed, FAO is working with the Chinchiná Watershed Forestry Project (El Proyecto Forestal de la Cuenca del Río Chinchiná [PROCUENCA]) to:

- improve the regulation of freshwater supplies and restore microwatersheds;
- slow down soil erosion and reduce the sedimentation of waterways;
- promote the increase of biodiversity; and
- capture large quantities of atmospheric CO₂.

PROCUENCA uses different methods to involve communities and make their activities sustainable in the long-term. These include facilitating access to financing, advancing community management of water resources and promoting agroforestry and silvopastoral activities through outreach and training. In December 2007 alone, FAO support to PROCUENCA helped the School of Forestry Leadership train some 1 200 producers, workers and rural youths in a series of 52 events.

Furthermore, FAO has been supporting authorities to apply biodiversity monitoring methodologies and indicators alongside the carbon sequestration monitoring programme. These efforts have translated into quantified evidence that buyers of carbon credits from the project have contributed to the regional increase in biological diversity by shifting land use from cattle and coffee farming to forestry. PROCUENCA is the first of large-scale project of its kind in Colombian and the second in Latin America.

Source: STANDING TALL: Exemplary Cases of Sustainable Forest Management in Latin America and the Caribbean (2010)

Managing seed resources: The Global Crop Diversity Trust and the National Information Sharing Mechanism on Plant Genetic Resources for Food and Agriculture Since 2004

New crop varieties represent a key tool in climate change adaptation, since they are developed to withstand heat, drought, flooding and other extreme conditions. Breeding new varieties often takes around 10 years; therefore, while they may seem to belong to the distant future, the dramatically different climatic conditions predicted for 2030 are in actuality only two crop breeding cycles away. Research in climate-resilient crops is a matter of urgency.

14

In 2004, FAO supported the institution of two different structures on the vanguard of crop resilience research: the *Global Crop Diversity Trust* and the *National Information Sharing Mechanism on Plant Genetic Resources for Food and Agriculture*.

The Trust supports the *International Treaty on Genetic Resources for Food and Agriculture*, which coordinates a gene pool of over 1.3 million unique crop samples. In particular, the Trust funds seed collections vital to developing countries. In 2011, for example, the nutritious and resilient sweet potato became the seventeenth food crop to secure protection from the Trust. The Trust also screens genebank collections for traits conducive to climate change adaptation. It has provided a head start to programmes in Asia, Africa and South America as they work to breed climate-ready crops.

The *National Information Sharing Mechanism*, on the other hand, facilitates cooperation and information exchange on seed-related topics directly with national stakeholders. The Mechanism supports the *Programme for Conservation and Utilisation of Plant germplasm and Agro-biodiversity*. The Mechanism has been established in 71 countries, and over 1 000 public and private organizations, including farmer associations, have been participating. FAO has contributed to the Mechanism's state-of-the-art computer application, which helps identify areas in which further action is required to ensure crop diversity is put to use for climate change adaptation in an efficient and globally coherent manner.



**GLOBAL CROP
DIVERSITY TRUST**

www.croptrust.org
www.nbc.gov.bt/nism/description.html



The Transboundary Agro-ecosystem Management Project for the Kagera River Basin 2010 – 2014

The Kagera River Basin is a key freshwater resource base and biodiversity area for Burundi, Tanzania, Rwanda and Uganda. Some 16.5 million people depend heavily on the basin's agricultural productivity. However, projected population growth and climate change are poised to exacerbate the area's existing problems of land degradation, deforestation and encroachment of agriculture into wetlands.

Through the Kagera project, FAO and partners have been employing a wide array of technologies and processes to address these problems. Using assessments by the World Overview of Conservation Approaches and Technologies and the Land Degradation Assessment in Drylands, project efforts are working to figure out new ways to manage land and increase yields while pioneering new technologies and approaches. FAO efforts are helping to build a geographical information system to scan for new, previously overlooked locations where sustainable land management technologies and strategies can be applied to greatest affect.

Multilateral partners are also working with FAO to ensure close monitoring of project impacts on ecosystems and livelihoods. By August 2014, FAO expects project efforts to result in:

- 30 percent increase in vegetation cover;
- 20 percent increase in carbon stores over 30 500 hectares of land; and
- 10 percent increase in crop, livestock and other product yields.

By project end, FAO and partners will have provided training to nearly 125 000 people, ranging from local farmers to technical staff and policy makers.



www.fao.org/nr/kagera/about-kagera/en

4

TECHNOLOGIES, PRACTICES AND PROCESSES FOR ADAPTATION



Climate change adaptation can only be successful when theory and practice are intertwined. This is why FAO supports the development and dissemination of adaptation-related technologies, practices and processes in a variety of key areas, including: agriculture; forestry; fisheries; value chains; rural energy; rural income diversification; and conservation. Efforts include:

- increasing the efficient use of fertilizer, seeds, energy and water; and
- developing strategies to communicate for development in adaptation.

FAO places a particular emphasis on ensuring women have equal access to technologies.

Communication for Development Strategies and Tools in Community Based Climate Change Adaptation: Bolivia 2008-2012

For climate change adaptation to work, efforts must not only be tailored to technical specifications and local needs; communities need to have a high degree of project ownership. Realizing that development is people-driven, FAO has been implementing Communication for Development initiatives for over 30 years. Communication for Development can support climate change initiatives by:

- facilitating knowledge exchange and learning;
- improving participation and coordination;
- matching supply and demand for adaptation support services; and
- mediating conflict situations.

Through the Communication for Sustainable Development Initiative (CSDI), FAO has been working to improve climate change adaptation and food security across several regions. Through CSDI, FAO has focused Communication for Development efforts on: documenting best practices, training authorities and farmers in strategies and tools, implementing plans in field pilot projects; and assisting local and national institutions as well as other FAO projects.

CSDI work in Bolivia has garnered particular success. Running from 2008 to 2012, this component has supported agricultural innovation and adaptation by helping authorities develop, test and apply a National Communication Programme that is the result of community consultations and participatory processes. FAO efforts have reached out to communities by a variety of media, including videos and radio programmes, to share knowledge and information with remote, vulnerable communities on subjects like water harvesting, direct sowing, forage conservation and pasture management for dairy cattle.



<http://csdinitiative.org>



Areas under frequent threat of climate-related emergencies are often where adaptation initiatives can make the biggest difference. By integrating adaptation and disaster risk reduction and management strategies, FAO helps countries prevent and reduce hazard impacts on farmers, forest users and fisher folks helping communities build resilience to confront climate change threats.

Disaster Risk Management Systems Analysis training package

2011

FAO designed its Disaster Risk Management training package to support governments worldwide with the concepts and tools required to reduce and manage natural disasters. The package explains how to analyse actors, policies and capacities at national, intermediate and local levels in order to design possible pathways to deal with risks. Championing the need for well functioning institutions at all levels, FAO applies its expertise to help guide countries transitioning from reactive to more proactive disaster risk management approaches.

The FAO training course promotes proactive, long-term risk reduction strategies and measures as part of an integrated approach to disaster risk management. Written from the agriculture perspective, FAO's training package gives planners and policy analysts as well as field practitioners, extension officers and field technicians the tools they need to plan for disaster risk reduction and management. The training course consists of two components:

- classroom based training in disaster risk management as a whole; and
- field exercises with a particular focus community level assessment.

Throughout 2011 FAO field tested the training course with participants from a wide range of civil service backgrounds in Thailand, Togo and the Philippines. The participants, who included regional, national and local authorities as well as academics and FAO country-based staff considered that the course was relevant and applicable to their work. Building on lessons learned from field testing, FAO expanded the course's scope to address differences between a response-oriented and a proactive disaster risk management approach.

<ftp://ftp.fao.org/docrep/fao/010/ai504e/ai504e00.pdf>

Disaster Risk Management (DRM) and emergency preparedness in the Caribbean

Various projects since 2005

In 2004 alone, at least 6 000 lives were lost to hurricanes in the Caribbean, over a million people were affected. Damages exceeded several billion US dollars, and the productive sectors, including agriculture, accounted for over a third of this cost. Similar devastation took place in 2006, 2008 and 2010. The need was clear for an urgent re-thinking of disaster risk management options.

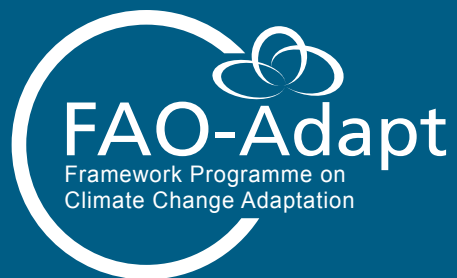
In response, FAO implemented a regional project to improve agricultural emergency preparedness in Cuba, Grenada, Haiti and Jamaica by assessing existing strengths and weaknesses in institutional disaster risk management frameworks with regard to agriculture. With this information in hand, FAO helped these countries build up the required institutional and technical capacities in their respective agriculture agencies. FAO's work also developed community-based management and provided good practices on enhanced hazard risk reduction. These practices have proved to be highly successful in stimulating local DRM initiatives, the results of which have contributed to the design of a long-term rehabilitation strategy for Haiti after the 2010 earthquake.

Other action plans on DRM and agriculture have since been developed upon request for other Caribbean states, including St Lucia, Jamaica and Belize. With FAO support, authorities used the Caribbean project model to frame a regional disaster risk management project in the tropical Andes. Building on its success, in 2012 FAO launched a new project in Haiti that continues to bridge emergency and climate change adaptation work.

www.fao.org/climatechange/projects/regional/caribbean







FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Viale delle Terme di Caracalla
00153 Rome, Italy
climate-change@fao.org
www.fao.org/climatechange/fao-adapt

