



SPOTLIGHT ON KEY PUBLICATIONS: CLIMATE CHANGE ADAPTATION IN MOUNTAIN ECOSYSTEMS

Mountain ecosystems in Central America and the Andean region play an important role in relation to economic activities, ecosystem services and cultural heritage in numerous Latin American countries. It is the mountains where the region's most important water sources originate, providing a constant water supply to some of the largest cities in South America, including Mexico City, Bogota, Quito, La Paz and Lima. These zones also represent centres of origin of cultivated staple crops that provide vital sources of food. Over millennia, native communities developed their own practices to adapt to climate variability in these zones, some of which are still in use today. During the last decade, advances in research and practice have led to implementing strategies to support communities and nations to adapt to new challenges posed by climate change. This selection of publications highlights key resources documenting these policy and practice experiences, focusing on: [Adaptation Strategy and Programme Design](#), [Country Case Studies](#), [Practical Tools](#), [Traditional Knowledge](#), and [Sustainable Water Management](#).

ADAPTATION STRATEGY AND PROGRAMME DESIGN

► [Climate Change Adaptation: Experiences from Latin America](#)

This journal article presents an analysis of climate change adaptation strategy design and advocates for participatory approaches at the national and local level. Drawing on experiences from Bolivia, Colombia, Ecuador and Peru, it includes programmes specifically targeting mountain ecosystems. The authors highlight the importance of basing adaptation processes on the following key components: vulnerability and impact assessments of natural and human systems; capacity building; adaptation measures, in particular, natural resource management, adaptation of vulnerable infrastructure, building information networks for early warning and disaster prevention, strengthening social networks and increasing community participation. This publication will be particularly useful to actors in other regions involved in project design and implementation.

Full Citation: Levine, T., Encinas, C. 2007. Adaptación al Cambio Climático: Experiencia en América Latina (Climate Change Adaptation: Experiences from Latin America). *Revista Ambiente y Desarrollo* 23 (2): 41-47.



► [Climate Change Adaptation: The Role of Ecosystem Services](#)

This publication provides summaries of 50 presentations given during a 2008 international conference organised by the [Tropical Agricultural Research and Higher Education Center \(CATIE\)](#) on climate change adaptation and the role of ecosystem services, such as food supply and purifying water sources. The presentations cover: climate change impacts on ecosystems and ecosystem services; social vulnerability; adaptation policy; communication strategies; financial mechanisms; and public-private initiatives. This publication will likely be most useful to researchers and project implementers, as it also contains a database of 131 projects related to climate change adaptation carried out in Latin America.

Full Citation: CATIE. 2008. *Adaptación al Cambio Climático: el Rol de los Servicios Ecosistémicos (Climate Change Adaptation: The Role of Ecosystem Services)*. CATIE, TroFCCA, SIASSE, San Juan.

► [Climate Change in a Living Landscape: Conceptual and Methodological Aspects of a Vulnerability Assessment in the Eastern Cordillera Real of Colombia, Ecuador and Peru](#)

This publication presents a conceptual model and methodology for assessing vulnerability to climate change in the Eastern Cordillera Real region of the Andean mountain range in Colombia, Ecuador and Peru. The authors propose tools with which to determine how different systems, such as landscape, community and biodiversity systems, will respond to changes in climatic conditions. They also include tools to analyse the capacity of these systems to adapt to climate change and to prioritise adaptation activities. Finally, the publication includes guidelines for a regional climate change adaptation strategy in the Eastern Cordillera Real focusing on three main areas: governance; local adaptation; and information and knowledge.

Full Citation: UK Department for International Development (DFID), World Wildlife Foundation (WWF). 2011. *Climate Change in a Living Landscape: Conceptual and Methodological Aspects of a Vulnerability Assessment in the Eastern Cordillera Real of Colombia, Ecuador and Peru*. DFID/WWF, Santiago de Cali.

► [Fourth National Communication on Climate Change: Climate Change Adaptation Programmes - Impacts, Vulnerability and Adaptation](#)

This chapter of the National Communication on Climate Change describes the climate change adaptation strategies and programmes the Mexican Government is implementing via its Special Climate Change Programme (*Programa Especial de Cambio Climático- PECC*), which includes activities in tropical mountain forests. Amongst other components, the PECC contains strategies for assessing the economic impacts of climate change and for building capacity at national, regional and sectoral levels. In addition, the PECC describes adaptation measures for achieving sustainable natural resource use, environmental protection and sustainable development in the agricultural and fishery sectors. This publication provides useful reference material for policymakers interested in the design of national adaptation programmes.

Full Citation: Instituto Nacional de Ecología. 2009. *México Cuarta Comunicación Nacional, Capítulo IV (Fourth National Communication on Climate Change: Climate Change Adaptation Programmes - Impacts, Vulnerability and Adaptation)*. Instituto Nacional de Ecología, México.



► [Networks for Risk Management and Climate Change Adaptation](#)

The book presents experiences from Peru's [Regional Groups for Risk Management and Climate Change Adaptation](#) (*Grupos Regionales de Gestión del Riesgo y Adaptación al Cambio Climático* - GRIDES). These groups bring together a diverse range of stakeholders - including producers' associations, community leaders, local, regional and national government representatives, universities, NGOs, womens' organisations and youth groups - to create dialogue and collaboration on disaster management and climate change adaptation initiatives. The authors assert that adaptation strategies should not just be limited to the use of hard technologies, but must also include strengthening government institutions and civil society as well as recovery of ancestral knowledge and practices for climate prediction. This publication will be useful to practitioners, policymakers and researchers in approaching climate change through strengthening civil society, governance and multi-stakeholder networks.

Full Citation: Soluciones Prácticas ITDG. 2011. *REDES de Gestión de Riesgo y Adaptación al Cambio Climático (Networks for Risk Management and Climate Change Adaptation)*. Christian aid, Oxfam América, GRIDES, Soluciones Prácticas, Lima.

COUNTRY CASE STUDIES

► [Climate Change Adaptation Experiences from Mountain Ecosystems in the Northern Andes](#)

Compiling proceedings of a 2009 regional workshop held by [WWF](#) in Colombia, this document presents key findings from a range of initiatives on national policy and climate change adaptation implemented in the northern Andes. These case studies will be of interest to practitioners and policymakers in South Asia and Sub-Saharan Africa seeking to understand different approaches, such as ecosystem- and community-based adaptation, and how these are being applied in national and regional-level programmes.

Full Citation: Franco-Vidal, C. et al. (eds). 2010. *Experiencias de Adaptación al Cambio Climático en Ecosistemas de Montaña en los Andes del Norte* (Climate Change Adaptation Experiences from Mountain Ecosystems in the Northern Andes). Report of Regional Workshop, 19-20 February 2009. WWF, MAVDT, Ideam, Fundación Humedales, Bogotá.

► [Climate Change Adaptation in Peru: The Local Experiences](#)

This book summarises the results of seven community-based climate change adaptation projects implemented by Practical Action Latin America (*Soluciones Prácticas*) in the Peruvian Andes. The technologies covered include agro-forestry, water resource management, and native crop and biodiversity protection. The authors emphasise the important role played by social networks in generating and disseminating information and knowledge for adaptation processes. This publication will be useful for researchers, practitioners and policymakers interested in project design, implementation and evaluation, and in particular those interested in seeing how these play out in the Peruvian context.

Full Citation: Clements, R., Cossío, M., Ensor, J. (eds.) 2010. *Climate Change Adaptation in Peru: The Local Experiences*. Practical Action Latin America (Soluciones Prácticas), Lima.



► [Mountains and Climate Change - From Understanding to Action](#)

This publication assesses the challenges presented by climate change in mountain ecosystems around the world. Key themes covered include water resources, glaciers, natural hazards, biodiversity, food security and migration. The publication includes case studies of key climate change adaptation initiatives from Latin America, such as: participatory environmental monitoring in the highlands of Colombia, Ecuador, Peru and Venezuela; glacial measuring by state authorities in Peru; a multi-actor initiative promoting new platforms for dialogue, action and capacity building in high mountain zones; and a research project led by the [International Potato Center](#) aimed at protecting the biodiversity of native potatoes. The document concludes with a series of recommendations for sustainable mountain development.

Full Citation: Kohler, T., Maselli, D. (eds.). 2009. *Mountains and Climate Change - From Understanding to Action*. University of Bern, Bern.

► [Climate Change and Mountains: Adaptation and Resilience in Mountain Communities and Ecosystems around the World](#)

This edition of The Mountain Institute newsletter features an analysis of a Peruvian initiative to conserve and reforest native tree species in high mountain zones. The project found that by promoting sustainable forestry practices, rural communities were able to generate additional sources of income from selling firewood. Complementary activities focused on improving livestock raising techniques also enabled families to increase household income levels. The newsletter also contains information on projects in mountainous zones in Nepal, North America and the Tibetan Plateau. It will be useful for practitioners looking for examples of practical experience, as well as those focusing on forest environments.

Full Citation: The Mountain Institute. 2009. *Climate Change and Mountains: Adaptation and Resilience in Mountain Communities and Ecosystems Around the World*. The Mountain Institute.

► [Vulnerability and Adaptation to Climate Change in the Central Peruvian Andes: Results of a Pilot Study](#)

This study provides an analysis of the vulnerability of climatic, physical and social conditions in the Mantaro river basin in the central Peruvian Andes. It also takes a sectoral approach, identifying adaptation options for agriculture, hydro-energy and health. The study finds that the key socio-economic factors that increase vulnerability to climate change in this mountainous zone are low household incomes, urban migration, lack of access to basic services, frequent conflicts over natural resource use, high levels of pollution, poor household infrastructure, disorganised urban growth and the loss of traditional production systems. Consequently, the authors argue that climate change adaptation in the Peruvian Andes should incorporate technology, education, information, creativity, innovation, access to resources and institutional networks. This publication will be useful to actors interested in understanding methodologies for developing adaptation strategies focused on particular sectors, and in understanding vulnerability factors present in one particular mountain ecosystem.

Full Citation: Martínez, A.G. et al. 2006. *Vulnerability and Adaptation to Climate Change in the Peruvian Central Andes: Results of a Pilot Study*. Instituto Geofísico del Perú, Yanapaj, University of Washington.



PRACTICAL TOOLS

► [CRiSTAL: A Tool for Community Identification of Risks – Adaptation and Livelihoods](#)

CRiSTAL is a tool developed to assist practitioners to evaluate resilience and risk with the active participation of communities. This publication presents experiences from 13 sustainable water management projects within Ecuador's National Climate Change Adaptation Programme (PACC), focusing on how [CRiSTAL \(Community-based Risk Screening Tool – Adaptation and Livelihoods\)](#) was used during design and implementation processes. The CRiSTAL tool itself is [free to download](#) and available in English, French and Spanish. This publication will be useful for practitioners and researchers interested in understanding the practical applications of the CRiSTAL tool and how to adapt it to their own contexts.

Full Citation: Gálmez, V., Encinas, C. 2010. *CRiSTAL: Herramienta Para la Identificación Comunitaria de Riesgos – Adaptación y Medios de Vida (A Tool for Community Identification of Risks – Adaptation and Livelihoods)*. PACC Ecuador, Quito.

► [Technologies for Climate Change Adaptation: Agriculture Sector](#)

This guidebook presents 22 technologies for climate change adaptation in the agriculture sector, primarily selected according to principles of agro-ecology, meaning focused on sustainability and reducing potential negative environmental and social affects. The technologies cover: planning; water use and management; soil management; crop management; livestock management; sustainable farming systems; and capacity building and stakeholder organisation. The guidebook will be useful for developing country governments, agricultural practitioners and stakeholders in conducting Technology Needs Assessment (TNA) and preparing technology action plans. Examples of the application of certain technologies in mountain ecosystems of Latin America, Asia and Sub-Saharan Africa provide a comprehensive source of data for researchers and other stakeholders.

Full Citation: Clements, R. et al. 2011. *Technologies for Climate Change Adaptation – Agriculture Sector*. UNEP Risø Centre, Roskilde.

TRADITIONAL KNOWLEDGE

► [The Impacts of Climate Change on Traditional Rural Agricultural Communities and Their Adaptation Responses](#)

Using examples from mountain ecosystems in Bolivia, Mexico and Peru, this academic article stresses the importance of identifying, analysing and disseminating information on how traditional knowledge is enabling native communities to adapt to climate change. The authors warn that a huge variety of local practices, from multi-cropping, conservation and productive use of local biodiversity, to collection of native plants, agro-forestry production systems and soil management techniques, are being left out of adaptation planning. In response, the authors recommend that agricultural producers should be involved in providing rural extension services to promote these technologies to their peers via organised networks. This publication will be useful for policymakers considering how to integrate local and traditional knowledge into adaptation policy and programme design.

Full Citation: Altieri, M., Nicholls, C. 2008. Los Impactos del Cambio Climático Sobre las Comunidades Campesinas y de Agricultores Tradicionales y sus Respuestas Adaptativas (The Impacts of Climate Change on Traditional Rural Agricultural Communities and Their Adaptation Responses). *Revista Agroecología* 3 7-28.



SUSTAINABLE WATER MANAGEMENT

► [Climate Change and Water](#)

This paper describes the main climate change impacts on water resources throughout the world, including mountain regions across Latin America, Africa and Asia. The authors provide examples of adaptation options, including strategies implemented in Latin America, such as rainwater catchments and storage systems, community-management, and water conservation practices aimed at optimising use. The important role of traditional and indigenous technologies is also covered. This publication provides a basic source of information useful to anyone interested in understanding the range of issues related to water and climate change.

Full Citation: Bates, B.C. et al. (eds). 2008. *Climate Change and Water*. IPCC Technical Paper of the Intergovernmental Panel on Climate Change. IPCC Secretariat, Geneva.

► [Climate Change, Water Crisis and Adaptation in the Andes Mountains](#)

This book is the result of the 2009 international conference 'Social Organisation and Water Management for Climate Change Adaptation', held in Peru. The publication provides information on how ancestral technologies and social organisation models are helping communities adapt to the challenges of depleting water resources and desertification in high mountain zones. Based on these experiences, the authors make public policy recommendations. The publication will therefore be useful for policymakers and practitioners considering how to incorporate participatory approaches and local knowledge into adaptation strategies.

Full Citation: Llosa, J., Pajares, E., Toro, O. (eds). 2009. Cambio Climático, Crisis del Agua y Adaptación en las Montañas Andinas: Reflexión, Denuncia y Propuesta Desde los Andes (Climate Change, Water Crisis and Adaptation in the Andes Mountains). Desco, Red Ambiental Peruana, Lima.

► [Tried and Tested Measures for Water Use and Management: A Contribution to Climate Change Adaptation in the Andes](#)

In analysing nine climate change adaptation experiences from Bolivia, Ecuador and Peru, the author of this book concludes that the majority of water use management practices have been developed autonomously and in response to climate change rather than in an organised and planned manner. Three key factors are identified for meeting water demands in the face of increased climate variability and more frequent extreme weather events in these three countries: storage and the capacity to manage fluctuations in water availability; ability to supply good quality water to all users; and protection, avoiding damage to livelihood activities, infrastructure and the environment. This publication will be useful for researchers and practitioners interested in planning and assessing water management practices.

Full Citation: Doornbos, B. 2009. *Medidas Probadas en el Uso y la Gestión del Agua: Una Contribución a la Adaptación al Cambio Climático en los Andes (Tried and Tested Measures for Water Use and Management: A Contribution to Climate Change Adaptation in the Andes)*. ASOCAM, Quito.

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FIND OUT MORE FROM [ELLA](#)

To learn more about climate change adaptation in Latin America's mountain environments, read the [ELLA Guide](#), which has a full list of the knowledge materials on this theme. To learn more about other ELLA development issues, browse other [ELLA Themes](#).

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