



# NEPAL

## CLIMATE VULNERABILITY PROFILE

US Foreign Assistance: <sup>1</sup> (thousands USD)	Requested FY 2012	Requested FY 2013
Estimated total:	84,833	75,100
Adaptation:	3,000	2,000
Feed the Future/ Agriculture:	10,000	10,000
Water:	2,100	2,526

Priority Adaptation Country in 2011: YES

Key Climate Stressors: Heat, Drought, Flooding

### INTRODUCTION

Nepal is located in the Himalayan mountain range between India and China. It is a landlocked nation with generally mountainous terrain. Much of the country's 28 million inhabitants live in rural areas, with only about 12-15 percent of the population concentrated in urban areas. Small-scale subsistence agriculture and other natural resource use about 78 percent of the country's work force and provide 36 percent of Nepal's Gross Domestic Product (GDP). Resource-dependent livelihoods are common in Nepal and the country has low literacy rates, high hunger rates, and widespread poverty. Nepal contains a significant amount of freshwater, derived from glaciers, snowmelt, and rainfall. This water and the associated river systems supply water for a large portion of the 178 million people who live in the Ganges River basin.

### PROJECTED WEATHER AND CLIMATE CHANGES

Nepal currently experiences a warm spring between March and May, monsoons that last from June to September, and largely dry winters. Average annual temperature is about 27°C, varying by region and altitude. Rainfall is driven by the monsoons, which bring about 250-450 mm of rainfall each month to the majority of the country.

**TEMPERATURE:** Projections of future temperature in Nepal suggest increases of 1.3-3.8°C by 2060 and 1.8-5.8°C by 2090 from the 1980-1999 base period. Warming is expected to occur more rapidly during the winter months.

**PRECIPITATION:** Average annual rainfall has decreased since 1960, by an average of 3.7 mm per month per decade. This decrease is particularly significant during the monsoon period (June-September). Climate models currently cannot clearly characterize future rainfall. However, estimates consistently suggest that southeastern Nepal will experience increases in rainfall.

**EXTREME EVENTS:** Floods and landslides are common occurrences in Nepal. These events are often triggered by heavy rains, while rapid snow and ice melt in the mountains also contribute to them. Glacial melt resulting from increased temperatures can also increase risk of Glacial Lake Outburst Floods. Droughts are also becoming more frequent, particularly during the winter months and in historically dry areas.

### KEY CLIMATE IMPACTS AND VULNERABILITIES

Changes in precipitation will be the primary source of Nepal's vulnerability to climate changes. Changes in precipitation, combined with changes in the rates and timing of glacial melt, could change the variability and availability of Nepal's water resources. Too much or too little water will have serious implications for Nepal's biodiversity and forestry, agriculture, and hydropower energy production. Too little rainfall will reduce rice and maize cultivation, which is the main source of food for much of the country's population. Inadequate rainfall would disproportionately affect already vulnerable populations, including women, the poor, and other disadvantaged groups. Too much rainfall can also destroy crops and increase topsoil erosion. Floods have already devastated populations living in lowland areas, particularly along river banks, and future floods are expected in new areas unaccustomed to flooding. Furthermore, much of the country's electricity system relies on hydropower production, which is vulnerable to both increases and decreases in rainfall. Reduced water flow would reduce hydropower production, while high water flows will increase erosion and result in siltation of the dams. In addition to precipitation impacts, increasing temperatures in the northern part of the country could increase the rate of glacial melt from the Himalayan glaciers, affecting water supply. Changes in glacial melt patterns can also impact downstream villages and areas by breaching river banks and other structures. This will also have implications on the timing of water available for residents of the Ganges River basin.

### KEY USAID PROGRAM VULNERABILITIES

**FOOD SECURITY:** Nepal is a focus country for the Feed the Future (FTF) Initiative. Climate changes could have negative impacts on agriculture, threatening food security. This would particularly impact the large proportion of the population that depends on small-scale subsistence agriculture. Rising temperatures and changes in total precipitation could reduce agricultural yields and affect the ability of families to raise livestock and produce livestock fodder. Flooding and landslides could completely wipe out crops. These impacts would add pressure to FTF efforts.

Under FTF, USAID/Nepal is promoting agricultural production of high-value vegetables, lentils, livestock, and drought/flood resistant varieties of staple grains. FTF also promotes nutrition, hygiene, and increasing resiliency of vulnerable groups. USAID will need to ensure that newer agricultural production initiatives take into account projected climate changes. For example, small-scale irrigation could be impacted by erratic or changing rainfall patterns and certain crops may be less productive under future climate conditions.

<sup>1</sup> US foreign assistance includes both USAID and Department of State program funding, but in most cases the bulk of this funding is implemented through USAID. In order to have comparable figures in these categories, all country profiles use figures from the Congressional Budget Justification (CBJ) (see <http://transition.usaid.gov/performance/cbj/185016.pdf> and <http://transition.usaid.gov/performance/cbj/158269.pdf>). Between the time of the budget request and the 653(a) report to Congress, these figures can change significantly.

**BIODIVERSITY:** The forests, biodiversity, and resource-dependent communities of Nepal are at risk from destructive heat, drought, forest fires, invasive plant and animal species, landslides, and floods projected from climate changes. Such risks are particularly high in areas with low connectivity between natural areas. The lack of connectivity disrupts ecological processes, preventing species migration and reducing genetic variability. Increased heat may bring an increase in invasive pests as well as new plant diseases, and rare mountain plant species will experience devastating habitat loss. USAID/Nepal receives Sustainable Landscape and Adaptation funding from the Global Climate Change Initiative, as well as earmarked biodiversity resources. Under the flagship Hariyo Ban program, USAID is investing in protecting the biodiversity of the country, promoting sustainable landscapes to help mitigate climate change, and preparing the Nepali people to adapt to the negative effects of climate change.

**ECONOMIC GROWTH AND EDUCATION:** The USAID/Nepal Economic Growth and Education portfolio includes programs that foster food security, flood recovery, early childhood education development, income generation, and trade. These programs are vulnerable to climate change impacts. For example, infrastructure rehabilitated or built by the Nepal Flood Recovery Program may be vulnerable to increased extreme events such as waterlogging or floods, forest fires, or landslides. Increased extreme events also put additional stresses on local people and available resources. Any degree of change in the availability of water, the availability of firewood, and agricultural production directly affects the quality of life of women and disadvantaged communities in rural areas. Climate changes may require increased work in agriculture or other industries, which may lower school attendance and education attainment, particularly for women and children. Finally, new agriculture pests and invasive species from climate changes may impact Nepal's international trade.

**HEALTH AND FAMILY PLANNING:** Nepal is a focus country for the Global Health Initiative. As such, USAID programs support the provision of sustainable, accessible, and quality basic health services to its citizens. These services address family planning, maternal and child health, nutrition, infectious diseases, and other environmental and public health problems, while also building capacity at all institutional levels. These efforts are vulnerable to a range of projected climate changes. First, climate changes could have serious impacts on the spread of water-borne and vector-borne diseases such as cholera and malaria, respectively. Increasing temperatures can affect the distribution and abundance of malaria vectors. Flooding can cause increased contaminant-loading of the water supply, while increasing temperatures can promote bacteria growth in water. Second, drought and decreased water availability may impact sanitation and hygiene practices and behaviors. This could impede progress currently being made on Millennium Development Goals. Finally, climate change impacts on agriculture could have significant nutrition-related health impacts. Programs targeted at preventing and controlling infectious diseases, promoting maternal and child health, and improving nutrition rates will need to understand how future climate impacts could change disease vectors, affect water quality levels, and affect availability of food.

**DEMOCRACY AND GOVERNANCE:** USAID is supporting the development of effective governance institutions in Nepal and promoting community inclusion within the political decision making process. While these programs are not directly vulnerable to climate changes, impacts such as food and water stress could jeopardize the political stability of the country and necessitate new or additional interventions.

**DISASTER RISK REDUCTION:** USAID supports a disaster risk reduction program to prepare the Government of Nepal to respond to disasters in a timely manner; support stakeholder engagement in disaster risk reduction activities, and help implement disaster risk reduction measures in development programs. Climate change impacts could increase the frequency, severity, and/or type of natural disasters affecting Nepal, further stressing this program. Promotion of climate resilient siting, design, and construction of buildings and small infrastructure projects is one way USAID can account for these projected changes.

## ACTIONS UNDERWAY<sup>2</sup>

USAID is supporting multiple programs in Nepal that directly address climate impacts, vulnerabilities, and future resiliency needs. For example, the Hariyo Ban program promotes biodiversity conservation by providing alternative livelihood opportunities and supporting policy development that recognizes the need for climate adaptation. A new, complementary program, the Initiative for Climate Change Adaptation (ICCA), works directly with communities to strengthen their resiliency to climate-induced changes. The Hill Maize Research Program (HMRP) is developing drought-resistance maize varieties to improve Nepal's climate change resiliency and food security. In addition, disaster risk reduction efforts adopt many of the strategies used to promote climate resiliency, including capacity building for relevant stakeholders and government officials, construction of disaster-resilient infrastructure, and implementation of early warning systems. Despite existing efforts, USAID still needs to ensure that adaptation considerations are mainstreamed into all of its various programs and initiatives.

## CHALLENGES TO ADAPTATION

Nepal recently developed its National Climate Change Adaptation Plan of Action. However, the recommendations in this plan have yet to be implemented. There are significant challenges to implementation, including shifting the country to a proactive, risk reduction approach for dealing with natural disasters. In addition, increased coordination between national and local government agencies and community stakeholders is needed in order to respond appropriately. Historically weak institutions have exacerbated the divide between government action and local needs. Lack of scientific research and data gaps are another major challenge. More disaggregated data (e.g., by geography, income, and ethnic groups) are required to understand the relative impacts of climate change and plan accordingly. Improved observations and forecasting methods are required to support the development of appropriate early warning and crop forecasting systems.

---

## RESOURCES

Government of Nepal, 2010. National Adaptation Programme of Action (NAPA), 2010. Accessed 4/27/2012. [http://www.napanepal.gov.np/pdf\\_reports/NAPA\\_Report.pdf](http://www.napanepal.gov.np/pdf_reports/NAPA_Report.pdf)

USAID, 2009. Feed the Future: Nepal FY 2010 Implementation Plan. Accessed 5/16/2012. [http://feedthefuture.gov/sites/default/files/country/strategies/files/FTF\\_2010\\_Implementation\\_Plan\\_Nepal.pdf](http://feedthefuture.gov/sites/default/files/country/strategies/files/FTF_2010_Implementation_Plan_Nepal.pdf)

USAID, 2012. Nepal Mission Country Page. Accessed 4/27/2012. <http://nepal.usaid.gov/>

World Bank, 2012. Nepal Dashboard. Accessed 4/27/2012. [http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCode=NPL](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=NPL)

---

<sup>2</sup> Actions underway include those from direct adaptation funds and indirectly attributed funds. More information on U.S. climate finance can be found at <http://www.state.gov/e/oes/climate/faststart/index.htm>.