HYDROMETEOROLOGICAL HAZARDS SECTOR UPDATE

University Corporation for Atmospheric Research (UCAR) staff member Martin Steinson provides an overview of a 3-D-printed automated weather station to Zambia Meteorological Department (ZMD) Director Jacob Nkomoki and ZMD staff. *Photo courtesy of Paul Kucera, UCAR*

An Introduction to Hydrometeorological Hazards

The UN defines hydrometeorological hazards as processes or phenomena of atmospheric, hydrological, or oceanographic nature that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Hydrometeorological hazards include cyclones, drought, floods, heatwaves, heavy snowfall, storms, and storm surges, but can also influence other hazards, such as epidemics, landslides, locust plagues, and wildfires.

Enhancing Flash Flood Guidance and Early Warning Systems

Each year, flash floods result in an estimated 5,000 deaths globally. In an effort to reduce loss of life and the economic impact of floods, USAID/OFDA—in partnership with the U.S.-based Hydrologic Research Center, the U.S. National Oceanic and Atmospheric Administration (NOAA), the UN World Meteorological Organization (WMO), and the national meteorological and hydrological services (NMHSs) of host countries—supports community organizations, local governments, and conservation, development, and humanitarian practitioners to more effectively monitor potential flash floods, thereby improving early warning lead times and enabling rapid response mechanisms. Through the implementation of new technologies, forecaster trainings, and technical assistance, the program aims to provide flash flood early warning guidance in countries where no such early warning capacity existed.

Sector Overview

Climate, weather, and water-related disasters—such as cyclones, droughts, and floods—account for the largest number of natural disasters worldwide and affect more people than any other type of natural hazard. Drought, extreme temperatures, floods, and storms resulted in approximately 600,000 deaths, affected more than 3 billion people, and caused an estimated $2 trillion in economic damages between 1994 and 2013. In the last four decades, the number of reported hydrometeorological disasters has increased almost fivefold, from approximately 750 incidents between 1971 and 1980 to 3,500 events between 2000 and 2010.

In Fiscal Year (FY) 2016, USAID's Office of U.S. Foreign Disaster Assistance (USAID/OFDA) provided nearly $13.9 million to support hydrometeorological activities, including disaster risk reduction (DRR) activities. DRR assistance reduces populations' vulnerability to climate and weather hazards while emphasizing locally sustainable and environmentally sensitive measures. USAID/OFDA works closely with vulnerable communities—as well as national and local governments, international and regional organizations, universities, and non-governmental organizations—to strengthen readiness, response, and resilience to climate- and weather-induced hazards.

USAID FROM THE AMERICAN PEOPLE

In FY 2016, USAID/OFDA continued supporting efforts to enhance flash flood guidance and early warning systems globally, with systems either operational or in various stages of development in 60 countries in Africa, Asia, Europe, Latin America and the Caribbean, and the Middle East.

Improving Weather Observation Using Low-Cost, Sustainable Technology

Active and informed weather observation is critical for providing early warning of hydrometeorological hazards. Many countries around the world lack adequate meteorological networks due to the high costs associated with weather monitoring equipment, as well as ongoing operational and maintenance expenses. USAID/OFDA, NOAA, and UCAR—in partnership with NMHSs—developed a low-cost and locally sustainable automated weather station model to improve weather observation capacity in countries with limited meteorological networks. Automated weather stations—which are produced utilizing microsensor technology combined with single-board computing systems and three-dimensional printers—have the capacity to simplify and expedite meteorological equipment repairs, increasing the scale and sustainability of meteorological networks. NMHSs can utilize automated weather stations to operate meteorological networks, comprising communication tools, stream gauges, and weather observation stations, that are consistent with local capabilities and needs. In FY 2016, USAID/OFDA and partners began testing automated weather station equipment in Curaçao and Zambia to evaluate accuracy and ease-of-use.

Mitigating El Niño-Related Risks

El Niño is a climatic event and naturally recurring phenomenon with global impacts. USAID/OFDA, NOAA, and the University of Colorado have partnered to raise awareness among national governments and NMHSs of the El Niño-Ready Nations campaign, which encourages countries to identify and mitigate El Niño-related risks. USAID/OFDA and partners are encouraging countries historically affected by El Niño to improve disaster readiness procedures, including engaging civil society members and NMHSs to better monitor and understand information about climate patterns and to develop important decision-making resources, such as early warning systems, data sharing networks, and mapping and modeling tools. USAID/OFDA, in partnership with the International Research Institute for Climate and Society, NOAA, and WMO, also co-sponsored the El Niño 2015 Conference in the U.S. state of New York, which provided a platform for strategic dialogues regarding El Niño impacts and the potential effects of long-term climate change.

Bolstering Climate Prediction Capacity

USAID/OFDA and NOAA, in partnership with WMO and NMHSs, organize workshops around the world to support building national and regional capacities for climate prediction, including encouraging the adoption of applications to strengthen preparedness for hydrometeorological events. In 2016, representatives from 53 countries participated in the eighth annual workshop, held in Turkey's capital city of Ankara. The workshop—which focused on the El Niño phenomenon, droughts, and flooding—trained climate professionals to use global forecasts in seasonal predictions and operational climate monitoring.

In addition to the Ankara workshop, USAID/OFDA supported regional climate outlook forums in Asia, the Caribbean, Europe, and the Middle East during 2016. The forums focused on local climate monitoring, assessment of large-scale climate patterns worldwide, verification of previous climate outlooks, and the production of a consensus statement for the winter 2016 climate outlook.

Strengthening Resilience to Climate-Related Disasters in Southeast Asia

USAID/OFDA supports the American Red Cross to strengthen disaster preparedness and resilience in coastal cities in Indonesia and other Southeast Asian countries through improved public engagement on climate change adaptation and resilience. With USAID support, the American Red Cross and the Project Management Institute plan to design and pilot a model for civic coalitions to guide and support community analysis, problem-solving, and decision-making on climate-related risks and resilience.

Reducing Flood Risk Through Green Methods

USAID/OFDA and World Wildlife Fund developed the document *Natural and Nature-based Flood Management: A Green Guide to support local governments and communities utilizing natural and nature-based methods for managing flood risk*. USAID/OFDA and World Wildlife Fund are working with partners to develop a complementary training curriculum for implementation in FY 2017.