

BUREAU FOR HUMANITARIAN ASSISTANCE



Hydrometeorological Hazards

OVERVIEW

Hydrometeorological hazards—such as cyclones, droughts, floods, heatwaves, storm surges, and tsunamis—account for the largest number of natural disasters annually and affect more people than any other type of natural disaster worldwide. These disasters result in the loss of lives, livelihoods and services, property damage, and social and economic disruption. Hydrometeorological hazards can also generate widespread threats such as epidemics, landslides, locust outbreaks, and wildfires, severely impacting populations around the world. Between 1999 and 2018, hydrometeorological disasters affected more than 4 billion people globally, caused more than 500,000 deaths, and resulted in an estimated \$2.2 trillion in economic damages, according to the Center for Research on the Epidemiology of Disaster.

USAID/BHA
Hydrometeorological Hazards
Funding in FY 2022

\$70,361,323¹

USAID's Bureau for Humanitarian Assistance (USAID/BHA) supports programs to reduce the adverse effects of hydrometeorological events through disaster risk reduction (DRR) activities designed to strengthen early warning systems for early action systems, disaster preparedness, and response and risk reduction capacity at local, national, and regional levels. USAID/BHA-supported DRR initiatives emphasize locally sustainable and

¹ The Natural Hazards and Technological Risk (NHTR) sector supports capacity-strengthening activities to enhance the ability of communities to manage and respond to future risks. Hydrometeorological hazards is a USAID/BHA sub-sector of USAID/BHA's NHTR sector. The funding amount reflects the total USAID/BHA contribution towards the NHTR sector, including \$57,656,890 for hydrometeorological hazards.

environmentally sensitive measures coordinated with vulnerable communities, as well as local and national stakeholders.

Flash Floods Guidance Systems Save Lives

Climate change and increased vulnerability and exposure to hydrometeorological hazards continue to exacerbate the impacts of floods—specifically flash floods—around the world. USAID/BHA partners with the U.S. Hydrologic Research Center, the U.S. National Oceanic and Atmospheric Administration (NOAA), the World Meteorological Organization (WMO), and host country national meteorological and hydrological services (NMHS) to support disaster managers, humanitarian organizations, and local governments in monitoring flash flood risks, improving early warning systems, and strengthening rapid response mechanisms. USAID/BHA continues to support global activities to enhance flash flood guidance and early warning systems, which are either operational or in development in 66 countries. Partner countries have affirmed that flash flood guidance systems led to significant reduction in the loss of lives and property damage over the past decade. These systems provide advanced warning of flash flood events to nearly 3 billion people across Africa, Asia, Europe, Latin America, and the Caribbean—approximately 40 percent of the world’s population—and contribute towards the initiative’s aim to provide advanced warning and enhance early action worldwide.

Weather Ready Nations: Empowering Local Preparedness Capacity

The Weather Ready Nations (WRN) program—managed by USAID/BHA and the U.S. National Weather Service (NWS)—strengthens countries’ preparedness for extreme climate, water, and weather-related events. WRN builds the capacity of NMHS and national disaster management agencies to improve the use of hydrometeorological information, shifting the focus of weather services from providing numerical weather forecasts to describing the potential impact of approaching storms and other forms of extreme weather. With access to actionable information, emergency managers, first responders, government officials, businesses, and the public can act upon early warnings to save and preserve lives, livelihoods, and property. USAID/BHA and the NWS continued to collaborate with NMHS in Barbados, Costa Rica, El Salvador, Guatemala, Indonesia, and South Africa to implement WRN in FY 2022. In addition, the agencies expanded the program to include the Bahamas, Fiji, and Jamaica’s NHMS during the year.

Affordable and Sustainable Technology to Enhance Weather Observations

Accurate and actionable weather observations are critical for providing early warning services and enabling early action against hydrometeorological hazards. However, many countries lack adequate hydrological and meteorological networks due to the high cost of monitoring equipment, alongside ongoing operational and maintenance expenses. In response, USAID/BHA, NOAA, the University Corporation for Atmospheric Research, and several NMHSs have developed 3D-printed automated weather stations (3D-PAWS), a low-cost and sustainable automated weather station model to improve weather observation capacity in countries with limited meteorological networks. 3D-PAWS have the capacity to simplify and expedite meteorological equipment repairs, increasing the scale and sustainability of meteorological networks. NMHS can expand the meteorological observation networks utilizing automated weather stations, while maintaining consistency with local capabilities and needs. In FY 2022, USAID/BHA and NOAA continued to expand development of water and other sensors to enhance data inputs and conducted workshops to train NMHS to produce weather and water sensors in Mexico, Trinidad and Tobago, and Türkiye to maximize the production of the 3D-PAWS and expand observation networks.

Developing Capacity to Improve Storm Surge Forecasts in the Caribbean

Storm surges—rises in seawater levels due primarily to winds generated by a storm—pose significant threats to the lives and livelihoods of coastal communities vulnerable to severe weather conditions around the world. Tropical cyclones can produce destructive storm surges and waves with potential grave impacts for populations residing in low-lying coastal areas regardless of whether the storms make direct landfall. USAID/BHA is working with the NOAA National Hurricane Center (NHC) and NMHS to extend storm surge modeling capabilities in Belize, the Dominican Republic, Haiti, and Mexico to allow local authorities to identify populations highly vulnerable to related risks and mobilize rapid response mechanisms in the event of a disaster. In FY 2022, USAID/BHA and the NHC collaborated with the Bahamas National Meteorological Service to further develop storm surge modeling capacities in the country.

More information on USAID/BHA sectors can be found at [usaid.gov/humanitarian-assistance/what-we-do/humanitarian-sectors](https://www.usaid.gov/humanitarian-assistance/what-we-do/humanitarian-sectors)