

BUREAU FOR HUMANITARIAN ASSISTANCE



Geological Hazards

OVERVIEW

Geological hazards, including earthquakes, landslides, and volcanoes, threaten billions of people worldwide and can devastate communities in a matter of seconds by killing or injuring people, destroying houses, and disrupting livelihoods. Although geological hazards are not preventable, proper risk mitigation and preparedness efforts can minimize the effects of geological events by saving lives, promoting resilience, and reducing the adverse economic effects of disaster.

USAID/BHA Natural Hazards and
Technological Risks Funding in
FY 2023¹

\$48,435,358

USAID's Bureau for Humanitarian Assistance (USAID/BHA) supports geological hazard preparedness and response activities, including disaster risk reduction programming, which emphasizes a comprehensive approach to reducing the impacts of geological hazards. USAID/BHA supports several global preparedness initiatives and co-funds three joint programs—the Earthquake Disaster Assistance Team (EDAT), the Landslide Disaster Assistance Team (LDAT), and the Volcano Disaster Assistance Program (VDAP)—with the U.S. Geological Survey (USGS). In FY 2023, USAID/BHA geological hazard-related funding supported activities in Central, East, Southeast and South Asia; Europe; Latin America and the Caribbean; the Pacific Islands; and East and West Africa.

¹The Natural Hazards and Technological Risk (NHTR) sector supports capacity-strengthening activities to enhance the ability of communities to manage and respond to future risks. Geological 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 \$12,312,655 for geological hazards.

Earthquake Disaster Assistance Team Responds to Türkiye Earthquakes

Following a magnitude 7.8 earthquake and dozens of strong aftershocks in February 2023 that resulted in the deaths of more than 50,000 people in central and southern Türkiye, EDAT scientists deployed to Türkiye in March 2023 to collaborate with in-country colleagues to reduce and mitigate damage from future earthquakes. EDAT documented earthquake-triggered landslides that continued to pose risks to vulnerable communities, conducted performance assessments of recently built structures, and trained international partners on best practices and software for monitoring the structural health of buildings. Additionally, EDAT experts provided remote training for the Government of Türkiye's Disaster and Emergency Management Authority on earthquake aftershock forecasting and extended seismometer coverage across the region, to support building code improvements, hazard identification, and land use planning. USGS engineers and scientists, supported by USAID/BHA, continue to work with Turkish colleagues to reduce and mitigate earthquake risk in Türkiye and advance understanding of and preparedness for earthquakes globally.

Bolstering Community Disaster and Risk Management Capacities

With support from USAID/BHA, Geohazards International (GHI) works to strengthen the capacity of communities to manage the risks and potential impacts of geological hazards. In FY 2023, GHI's work prioritized communities highly susceptible to geological hazards in areas also affected by the compounding effects of climate change, which could cause significant and long-lasting damage to infrastructure and livelihoods. GHI also used available research and technical expertise to develop planning scenarios for earthquakes, landslides, and volcanoes intended to facilitate awareness, planning, and mitigation efforts by local community members and decision makers.

USAID/BHA partner Global Earthquake Model Foundation (GEM) is a public-private partnership that aims to establish uniform and accessible standards for assessing and communicating local earthquake risk. In FY 2023, GEM continued implementation of its Forecasting and Communicating Earthquake Hazard and Risk project, which enables decision makers to implement better long-term planning for potential earthquakes by integrating forecasts of future population and building exposure into models of earthquake risk. Local partners have worked with GEM throughout the project to generate earthquake hazard and risk models that meet the needs and interests of their communities since 2022.

Leveraging Multi-Hazard Technical Expertise in Fiji and Tonga

During FY 2023, all three USAID/BHA and USGS co-funded programs—EDAT, LDAT, and VDAP—continued to provide technical assistance to Fiji and other countries in the Pacific following the January 2022 eruption of Hunga Tonga volcano in Tonga. The eruption generated significant ashfall and tsunami waves affecting an estimated 100,000 people in Tonga alone, or more than two-thirds of the country's population. The eruption also caused damage in coastal areas of Fiji and highlighted the need for further disaster preparedness efforts in the South Pacific. In response, EDAT, LDAT, and VDAP sent multiple USGS technical teams to collaborate with Fiji's Mineral Resources Department (MRD) and Tonga Geological Services (TGS). In FY 2023, USGS and MRD scientists selected a location for new earthquake instrumentation and VDAP and TGS installed multiple volcano monitoring stations countrywide. The addition of high-quality monitoring stations enables national authorities, international partners, and U.S. Government agencies to improve the speed and effectiveness of emergency response and public communications. During the fiscal year, USGS scientists also led workshops in Fiji for MRD and TGS staff focusing on earthquake and tsunami hazard mitigation. These programs benefit people across the South Pacific by building the capacity of national and regional response mechanisms, promoting the exchange of

ideas and data between technical teams, and supporting the provision of accurate maps and data from real-time monitoring in this geologically active region.

VDAP Training Advances Counterparts' Capabilities Worldwide

More than 3.6 million people living near volcanoes worldwide—including in Colombia, El Salvador and Indonesia—benefitted from VDAP activities in FY 2023. During the fiscal year, VDAP assisted local actors with modifying policies and procedures to better monitor volcanoes, including forecasting eruptions, interpreting seismic activity, and producing situational reports. VDAP responded to volcanic activity at the San Miguel volcano in El Salvador, Cotopaxi volcano in Ecuador, Villarrica volcano in Chile, and Nevado del Ruiz volcano in Colombia by providing volcano monitoring instrumentation and technical assistance. VDAP also led specialized training sessions and workshops for approximately 180 people on volcano-related disaster risk management. Notably, VDAP sponsored 12 students from Chile, Colombia, Costa Rica, Democratic Republic of the Congo, El Salvador, Indonesia, Peru, and the Philippines to attend the Center for the Study of Active Volcanoes International Training Course, jointly taught by VDAP and the University of Hawai'i. The eight-week course trained participants in the operation and maintenance of volcano monitoring equipment, including Global Positioning System data, to improve eruption forecasting for risk reduction. VDAP also trained counterparts on operating new volcanic gas monitoring instrumentation in Indonesia, forecasting eruptions in El Salvador, and improving volcano monitoring networks in Colombia and Ecuador.

Building Technical Capacity for Landslides Hazards Globally

Landslides—which can be triggered by earthquakes, human activity, or rainfall—can harm local populations, damage residential areas, and destroy critical infrastructure, such as electrical and water facilities. Since 2019, USGS and LDAT have provided technical assistance to help scientists identify and assess landslide hazards, deployed equipment to monitor landslide activity, and responded to landslide events. In FY 2023, LDAT continued collaborations with partners, including in-country trainings and workshops in Chile and Fiji for more than 30 participants, equipment donations to Chile, virtual meetings to provide technical expertise to El Salvador and Sri Lanka, and remote mapping to create a landslide inventory for the most populous islands of the Federated States of Micronesia. Additionally, LDAT provided landslide awareness to USAID/BHA staff to help inform humanitarian assistance activities following the Türkiye and Morocco earthquakes and New Zealand floods and landslides in 2023.



USGS scientist advises geological scientists from the Government of Chile on the installation of a landslide monitoring station beside the Maipo River basin near Chile's capital city of Santiago. *Photo courtesy of USGS and Stephen Slaughter.*

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)