




HYDROMET

Improving monitoring and prediction of meteorological and hydrological hazards

Robust weather services save lives, reduce impacts from disasters, and promote sustainable economic growth. GFDRR is working to improve the ability of developing countries to understand, predict, and warn their citizens of meteorological and hydrological hazards. The Hydromet program advises national governments to drive investment and increase knowledge in modern systems and tools. This helps to close the development gap and minimize loss and damage from future extreme weather events.

WHAT WE DO

-  The Hydromet program supports governments in strengthening hydromet monitoring, forecasting, and early-warning systems in vulnerable developing countries.
-  GFDRR helps countries plan and prepare for extreme weather, cooperating closely with national hydrological and meteorological (hydromet) services, disaster risk management agencies, and the World Meteorological Organization (WMO).
-  The Hydromet team assists governments in upgrading the technical systems that gather, analyze, and produce hydromet data, and provides training on how best to share and use that knowledge for decision-making purposes.

\$2.4 trillion

in economic losses were caused by hazards between 1970 and 2012.

26 million

people are forced into poverty every year by natural disaster

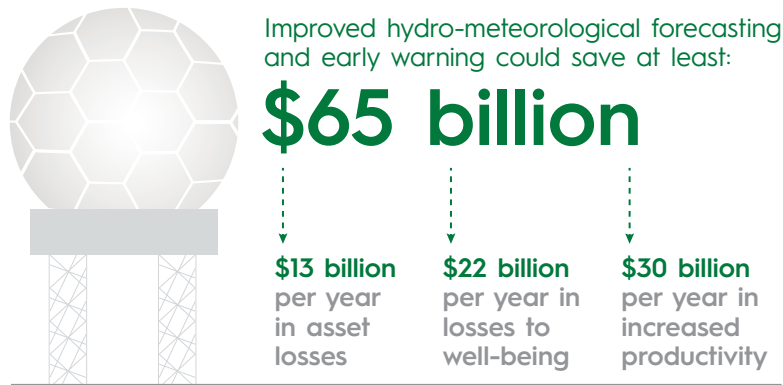
2 million

people were killed by natural hazards between 1970 and 2012.

\$1 → \$3

\$1 invested in weather and climate services equals at least \$3 in socioeconomic benefits.

OUR APPROACH



Upgrading Infrastructure

GFDRR delivers technical assistance in hydromet and early-warning systems (EWS), advising service management how to modernize and operate information systems needed to collect data, develop forecasts, and communicate the findings to the public and to risk managers.

The Hydromet team advises countries on the scope and composition of end-to-end hydromet service production systems that are sustainable within national fiscal and institutional constraints. The team also helps countries to make these systems operational.

After severe flooding in Sri Lanka, the team commissioned an assessment which concluded that improved forecasting and dissemination could have prevented damage. Subsequently, GFDRR developed an investment program

which is planned for inclusion in a larger WBG DRM operation.

Training and Capacity Building

Weak institutional capacity threatens the sustainability of investments in hydromet infrastructure.

For this reason, GFDRR's priority is strengthening institutional frameworks and service delivery. In cooperation with WMO, the Hydromet program ensures hydromet agency staff—including observers, ICT experts, forecasters and managers—have access to the best international approaches and learn to apply them.

The program also encourages governments to support capacity building, institutional strengthening, and resourcing to properly operate and maintain systems.

Measuring Impact

- » GFDRR is currently supporting **OVER \$600 MILLION** to improve hydromet agencies from partners such as WBG, Climate Investment Fund and Green Climate Fund.
- » The program has trained **MORE THAN 300 SPECIALISTS** in the last three years.
- » The initiative aims to support WBG in reaching an additional **100 MILLION PEOPLE** in developing countries with access to high-quality hydromet, and EWS data and services.

Coordination

The Hydromet program plays a unique role: **On the ground, it brings expertise to WBG teams, designing and implementing projects that strengthen national meteorological and hydrological agencies.**

GFDRR also maintains a strong partnership with the WMO and other development partners on its hydromet work. The WMO provides access to technical knowledge and expertise and links to the international policy dialogue. In turn, GFDRR helps leverage investment and ensures coordination and common approaches across partners.



Myanmar

One of the poorest countries in East Asia, Myanmar is transitioning to democracy with hopes of a brighter economic future. With 10 times the amount of per-capita water than China and India, it is a water-rich nation. This abundance is an asset, but it also presents a liability.

The Ayeyarwady is Myanmar's largest river basin and is often described as the heart of the nation. It is home to 70% of the population but is prone to severe flooding, leading to loss of life and large-scale economic damage. In 2015, Cyclonic Storm Komen caused damage equivalent to more than 3% of GDP, displacing an estimated 1.6 million people.

To upgrade the region's forecasting infrastructure, GFDRR helped design a \$30 million component of the Ayeyarwady Integrated River Basin Management Project. The project aims to modernize early-warning systems with the latest forecasting and communications technology, including mobile, to alert citizens to extreme weather and its potential impacts. The GFDRR team is also assisting in training programs for Myanmar's hydromet agency and advising the government on how farmers can exploit advanced knowledge of weather patterns.

In May 2017, the Department of Meteorology and Hydrology began developing its concept of operations. This plan will guide the design, implementation, and operation of the modernized hydromet systems, and aims to ensure that they remain financially sustainable.

The project is still in progress, but socioeconomic assessments indicate the basin could save more than \$8 million a year in damages and benefit from up to \$200 million in improved economic productivity.

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"The World Bank team, through GFDRR, have already helped us to develop a clearer strategy on how to modernize the service, to coordinate the work of lots of different development partners and to get ready for major projects in 2017. The project will improve the lives of farmers and other rural communities that are vulnerable to flood and droughts. Better forecasting and early warning will reduce the losses faced by farmers and help them to protect their incomes."

—May Khin Chaw, Deputy Director of Agro-Meteorology | Yangon, Myanmar

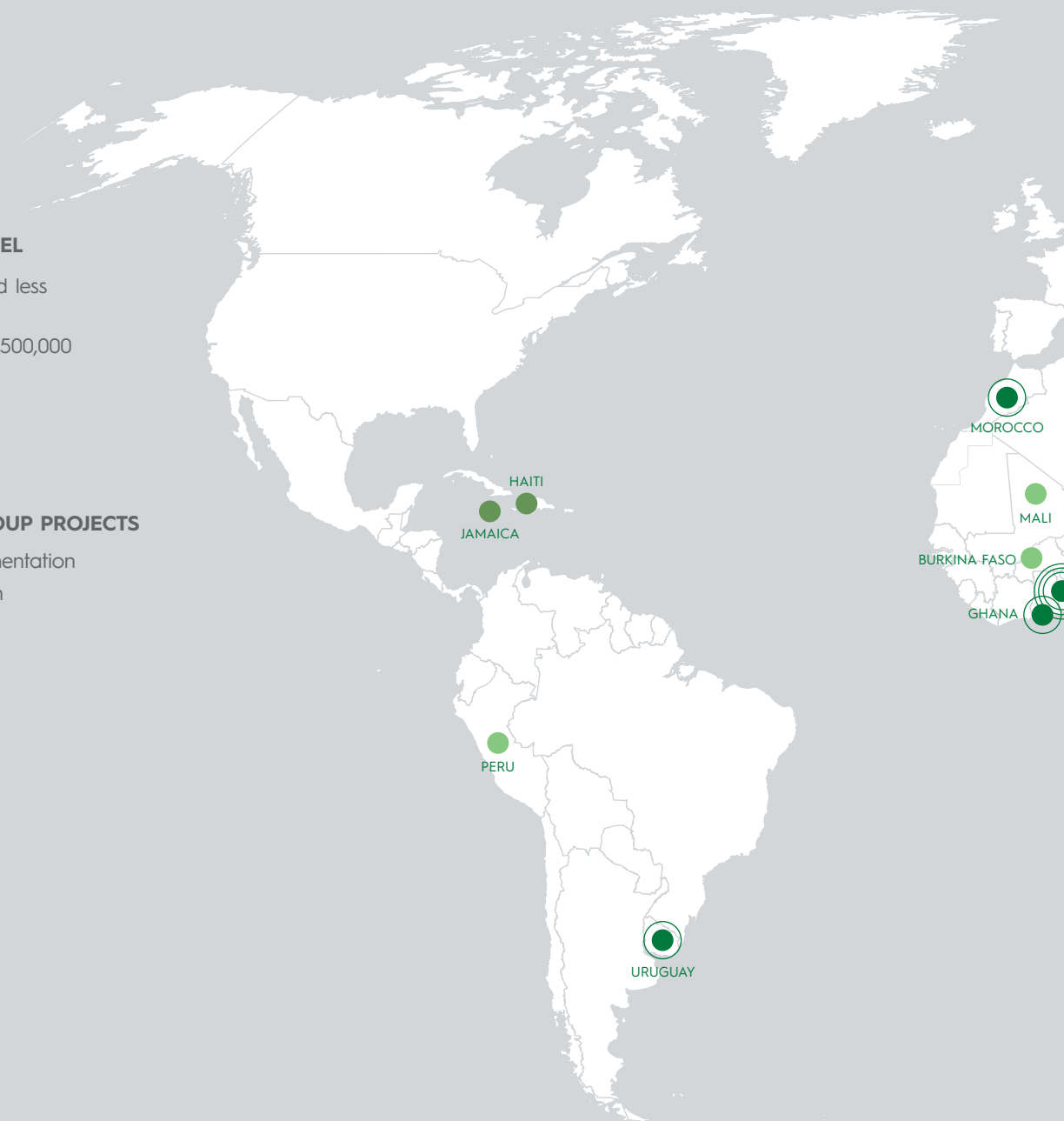
ACTIVE ENGAGEMENTS

ENGAGEMENT LEVEL

- \$1,000,000 and less
- \$1,000,100-\$2,500,000
- \$2,500,100+

WORLD BANK GROUP PROJECTS

- Under Implementation
- In Preparation



Next Steps

INVESTMENT SUPPORT

Launch up to six new projects in some of the world's least-developed countries in Africa and small island states.

KNOWLEDGE BUILDING AND CAPACITY SHARING

Complete four knowledge documents, including revised guidance on modernizing national hydromet services, a report on public and private collaboration in hydromet modernization, and an assessment of hydrological services delivery in developing countries.



IMPLEMENT THE CLIMATE RISK AND EARLY WARNING SYSTEMS INITIATIVE

Together with UN agencies, implement the Climate Risk and Early Warning Systems initiative—which seeks to mobilize \$100 million by 2020—launched by France and donor countries during the landmark climate conference COP21.

PROJECT IMPLEMENTATION

Provide support for implementation of at least 10 WBG-funded hydromet/EWS projects.

Sub-Saharan Africa

From droughts and flooding to tropical cyclones and landslides, Sub-Saharan African countries are particularly vulnerable to disasters due to uneven rainfall. But across the region, almost half of weather stations on the ground—and three-quarters of airborne stations—do not report data, making it difficult to know where and when these devastating hydromet-related hazards may strike.

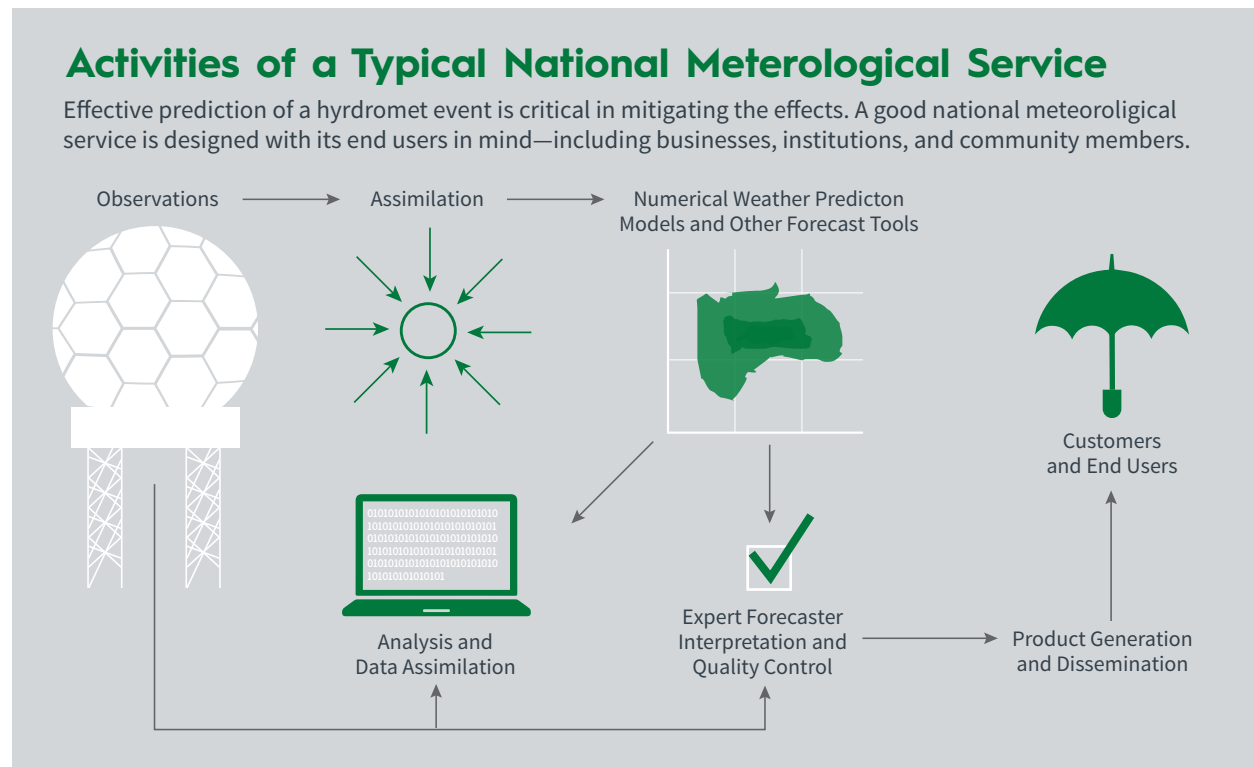
In partnership with the African Development Bank and the WMO, WBG and GFDRR launched the Africa Regional Hydromet Program with the goal of improving hydromet agencies and promoting collaboration across borders. Working nationally, regionally, and continent-wide, the program aims to raise up to \$600 million in funding to modernize, building monitoring and forecasting technologies that can generate weather information and strengthening the agencies delivering that information. In Mali, for example, GFDRR helped secure a grant of \$22.75 million from the Green Climate Fund and helped mobilize about \$10 million investments for the Democratic Republic of Congo.

The Hydromet program will make weather data more accessible, getting accurate and actionable information into the hands of decision-makers and the public. In so doing, it will help to reduce the human and economic cost of hydromet-related disasters and improve productivity in socioeconomic sectors sensitive to weather and climate conditions. The initiative can result in billions per year in economic benefits and act as a model for other regions looking to build their resilience to disaster.

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Activities of a Typical National Meteorological Service

Effective prediction of a hydromet event is critical in mitigating the effects. A good national meteorological service is designed with its end users in mind—including businesses, institutions, and community members.



Research to Build the Investment Case

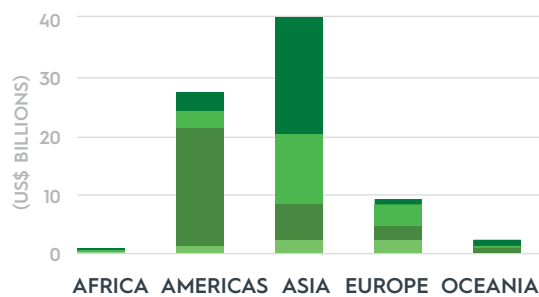
GFDRR’s Weather and Climate Resilience report outlined the case for overhauling hydromet agencies in developing countries around the world. In the last 15-20 years, these agencies have become so degraded that modernization is needed in more than 100 countries, half of which are in Africa. This overarching global challenge requires international investment of at least \$1.5 billion, with an additional \$300-400 million a year required to support the proper operation of modernized systems. The joint WMO, WBG, GFDRR and USAID report “Valuing Weather and Climate: Economic Assessment of Meteorological and Hydrological Services” strengthened the financing case by quantifying the benefits hydromet services provide and how this information can be used to prioritize investments.

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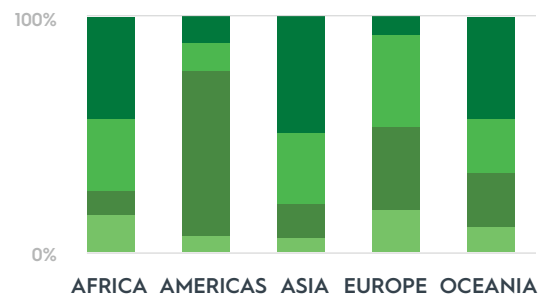


Average annual damages caused by reported natural disasters, 1990–2011

Average annual estimated damages per disaster group

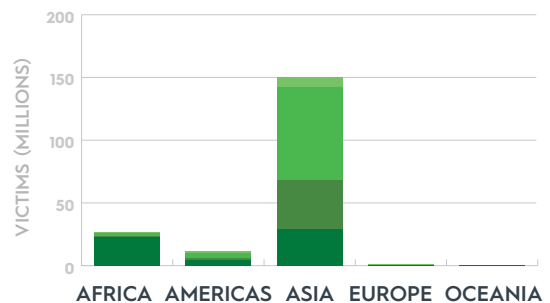


Proportion of average annual damages per disaster group



Average annual victims* (in millions) per disaster group, 2005–2015

	AFRICA	AMERICAS	ASIA	EUROPE	OCEANIA
Geophysical	22.94	4.10	29.29	0.12	0.19
Hydrological	0.25	1.62	38.58	0.15	0.06
Meteorological	3.02	4.33	74.81	0.37	0.08
Climatological	0.04	1.07	7.36	0.02	0.06



*Victims is defined as the sum of fatalities and total affected

GFDRR Engagement Notes

Hydromet

gfdrr.org/hydromet

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The Global Facility for Disaster Reduction and Recovery (GFDRR) is a global partnership that helps developing countries better understand and reduce their vulnerability to natural hazards and climate change.

GFDRR is a grant-funding mechanism, managed by the World Bank, that supports disaster risk management projects worldwide.

Working on the ground with over 400 local, national, regional, and international partners, GFDRR provides knowledge, funding, and technical assistance.