Hydrometric and meteorological (hydromet) information is useful for more than predicting weather on any given day. This information can save lives; reduce the impacts of hazards such as floods, storms and droughts; inform planning and decision-making; and improve the productivity of goods, services and businesses.

VALUE OF HYDROMET SERVICES

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CHALLENGES IN THE CARIBBEAN

Within the Caribbean, as with the rest of the world, National Meteorological and Hydrological Services (NMHS) agencies play a pivotal role in providing governments, the population and key end-users with the information needed to produce these benefits. However, these NMHS agencies face challenges that impede their ability to provide essential information. These include:

- Low visibility and recognition by national authorities
- Lack of financial resources for operations, maintenance and investments
- Limited staff
- Lack of qualified staff
- Obsolete and defective instrumentation, communication networks and data management systems

US$465 million was lost each year, on average, in the Caribbean due to hydromet hazards (1996-2015).

Timely and adequate hydromet services can reduce the impacts of hydromet extreme events

$1:$4

$1 invested in hydromet service in Saint Lucia can result in around $4 in savings in the long run.
In addition to the National Meteorological and Hydrological Services (NMHS) agencies, a number of actors including technical line ministries, media and key end users, are needed to ensure that users obtain the full benefits of efficient hydromet services. Further, once these actors are established, it is necessary to clearly define responsibilities, identify capacities required of each actor, and develop a collaborative environment conducive to continuous, seamless interaction. These actors, activities and interactions can be conceptually visualized through a value chain for various types of hydromet services.

**Value Chain for Flood Early Warning Systems**

- **Weather/Water/Climate**: Rainfall and river levels over several years.
- **Monitoring & Observation**: Rainfall and flood levels & Monitoring of rainfall and river levels.
- **Modeling & Forecasting**: Alerts based on emergency protocols & Forecast.
- **Dissemination**: Website, applications, text messages, sirens, etc.
- **Interpretation & Decision-Making**: Alerts based on emergency protocols & Forecasts.
- **Products & Services**: Statistical and spatial analyses of the data.
- **Benefit**: Lives saved & Damages reduced.

**Value Chain for Resilient Physical Planning**

- **Weather/Water/Climate**: Development/movement of (thunder-) storm, real-time precipitation, river levels.
- **Monitoring & Observation**: Development/movement of (thunder-) storm, real-time precipitation, river levels.
- **Modeling & Forecasting**: Forecast of rainfall and flood levels & Monitoring of rainfall and river levels.
- **Dissemination**: Website, intranet, other communication channels within the government etc.
- **Interpretation & Decision-Making**: Website, applications, text messages, sirens, etc.
- **Products & Services**: Alerts based on emergency protocols & Forecasts.
- **Benefit**: Lower damages & Fewer interruptions due to extreme hydromet events.
COMPREHENSIVE HYDROMET APPROACH

In a value chain, each link is essential to the overall outcome. Therefore, partial investments alone (e.g. in observation or better models) will not lead to the expected benefits. Instead, a comprehensive approach is required that:

- Strengthens all involved institutions including their interactions and collaboration along the value chain;
- Modernizes observation infrastructure and forecasting systems;
- Enhances the service delivery system;
- Possesses a clear, needs-based and user-oriented focus; and
- Takes all actors, processes and interactions along the value chain into account in order to achieve the expected benefits.

THE WORLD BANK’S CARIBBEAN HYDROMET ENGAGEMENT

The World Bank’s Hydromet Program in the Caribbean has been supporting countries such as Dominica, Grenada, Haiti, Jamaica, Saint Lucia and Saint Vincent and the Grenadines with:

- Development of comprehensive strategies including cost-benefit analyses for enhancing hydromet services;
- Technical assistance to strengthen priority capacities such as budgeting for operations and maintenance; and
- Comprehensive investments in institutional strengthening, modernization of hydromet infrastructure and enhancement of service delivery.

For further information on the principles and concepts for effective strengthening of hydromet services please consult the E-Platform on Weather and Climate Services for Resilient Development: A Guide for Practitioners and Policy Makers³ (https://olc.worldbank.org/content/e-platform-weather-and-climate-services-resilient-development-guide-practitioners-and-policy)

¹²³

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