



## Strengthening Hydro-met Services to Enhance Resilience of Small Island States

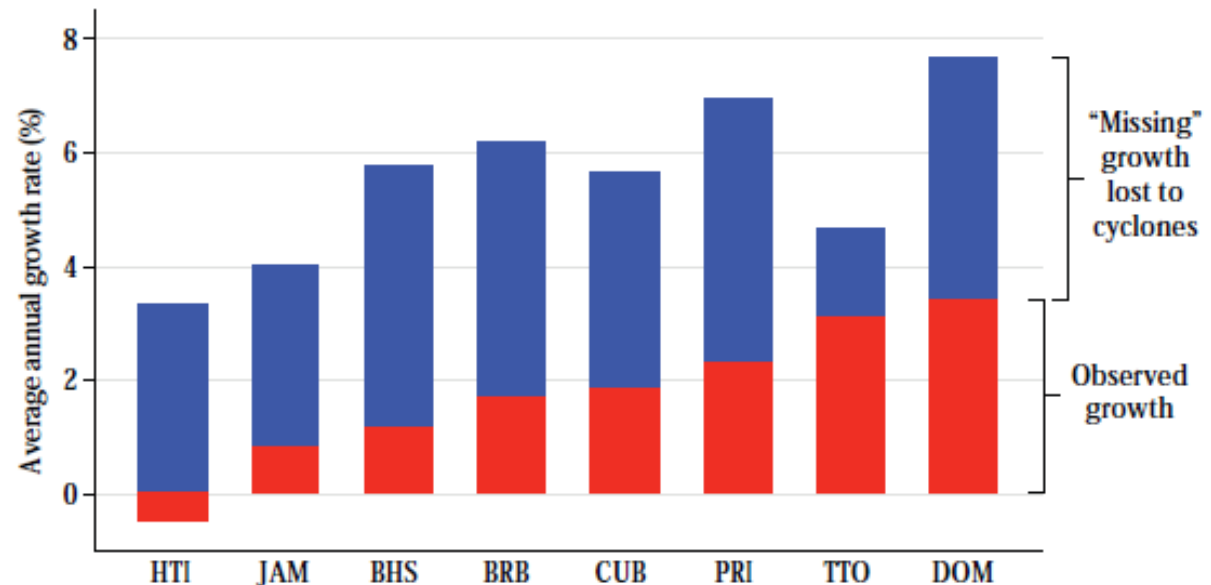
**Gaetano Vivo**  
Disaster Risk Management Specialist



# Building resilience to climate change and disasters is at the center of SIDS development challenges

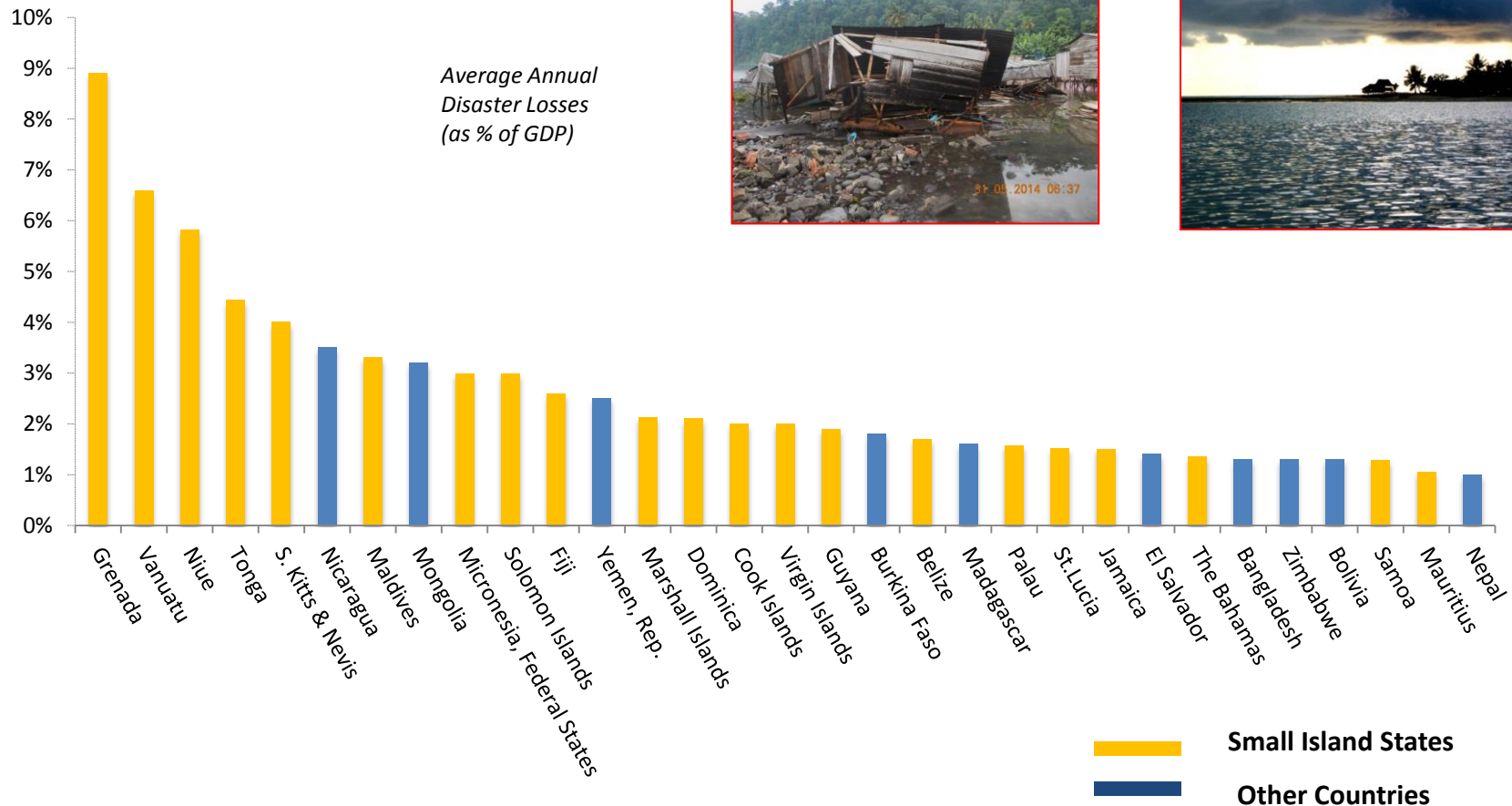
- *'leaking bucket' effect persistently affecting economic growth and development targets*

**A** Caribbean islands



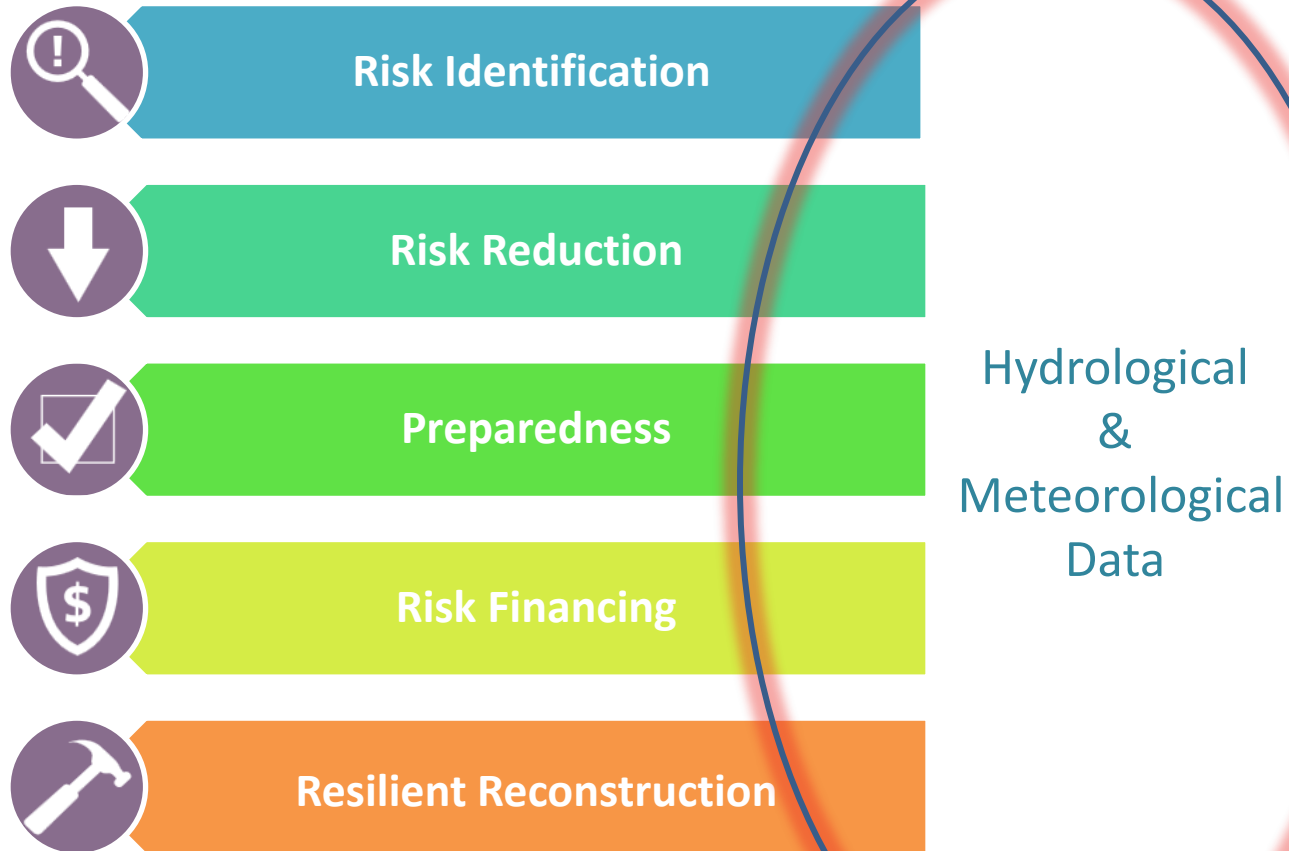
Source: Hsiang and Jina (2014)

# Small Island States are the most vulnerable economies to hydro-meteorological and climate hazards

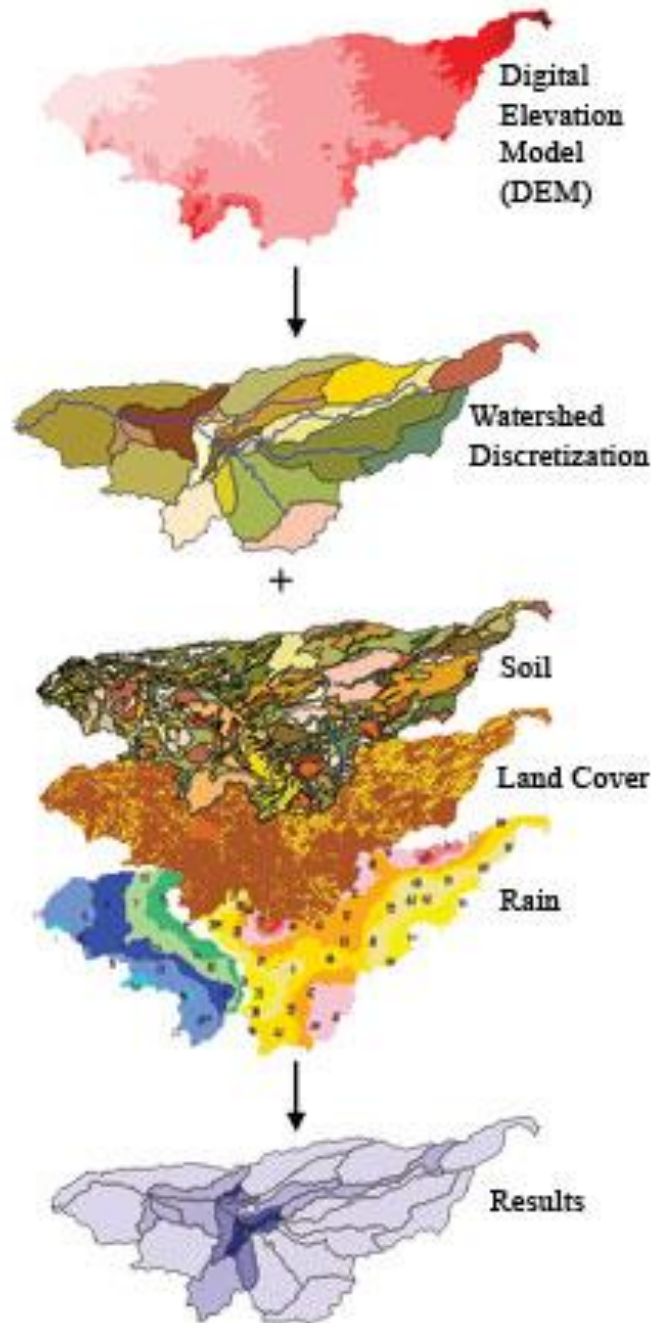


# Hydro-meteorological services are critical for resilience

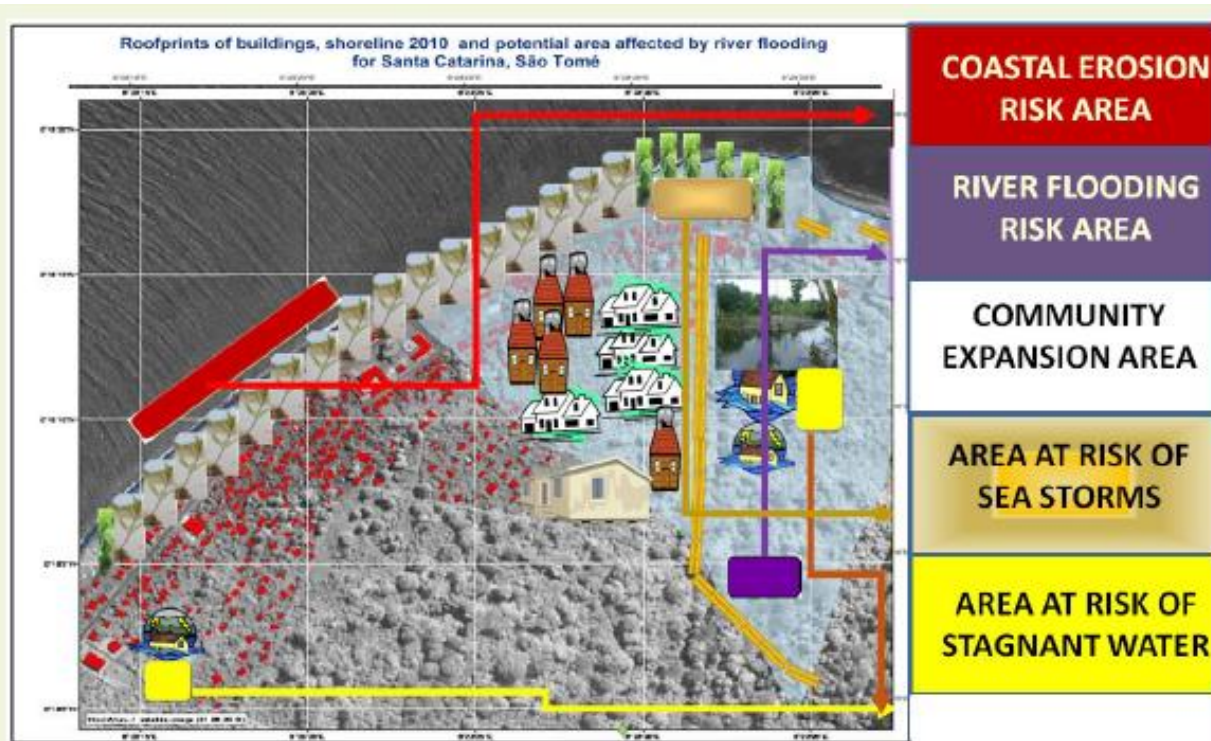
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Risk  
identification  
in the OECS:  
hydrological  
modelling



# Participatory resilient spatial planning in Sao Tome and Principe and Samoa



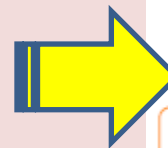
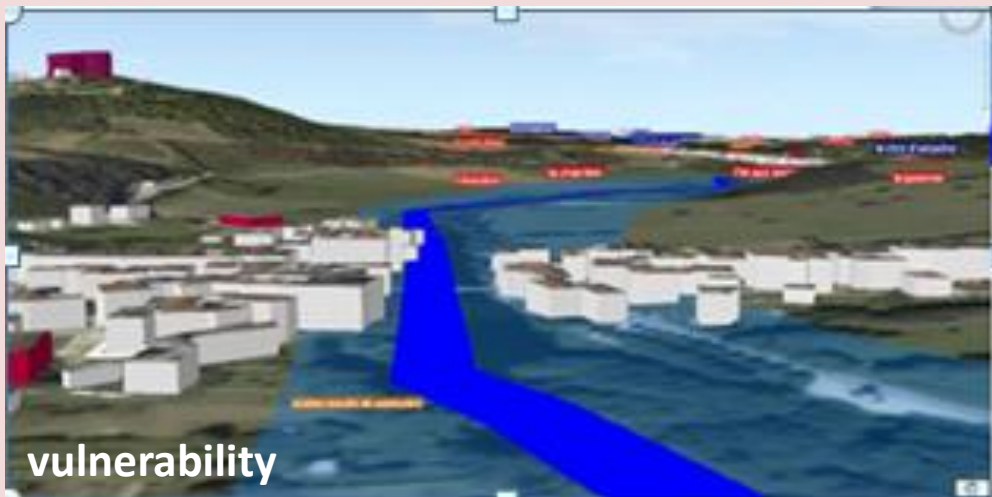
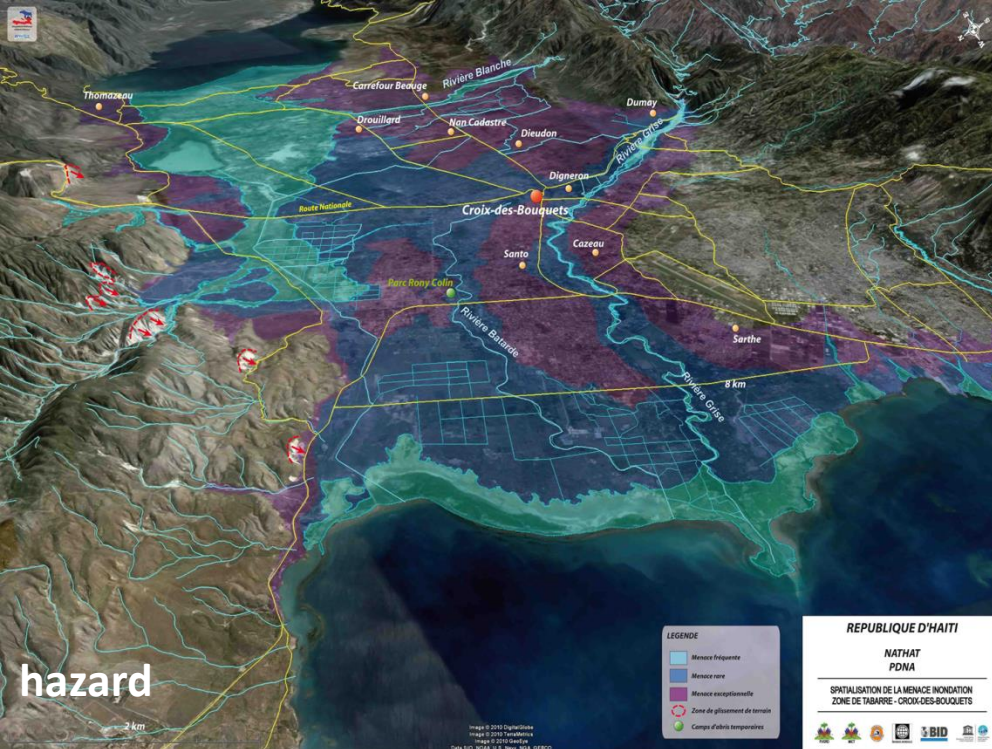
*By helping communities identify areas at risk, the Government of Sao Tome and Principe is helping them manage community retreat into safer expansion areas*

*Future public infrastructure will be located there to attract population to safer areas*

*Samoa has implemented an Infrastructure Asset*

*Management planning process at the district level since the early 2000s*

Source: Enhancing Climate Resilience of Coastal Businesses and Communities Project, Samoa and São Tomé and Príncipe Adaptation Project



# COMMENT GERER LE RISQUE INONDATION A CROIX DES BOUQUETS ?

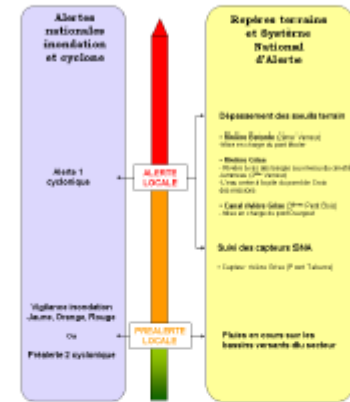
planing

## QUAND ?

→ Montée en puissance du dépasse



### Echelle des risques de Croix des Bouquets



## COMMENT ?

→ Graduation des actions à réaliser



### PHASE DE PRIORITE

Anticiper l'opérationnel ou l'alerte en amont sur le terrain versant

- MOBILISER le C.O.U.C et les C.O.U.L
- ASSURER des patrouilles de reconnaissance aux points de repère identifiés (Ct. Carte)
- VÉRIFIER la disponibilité et le bon fonctionnement des moyens d'alerte (mégaphone, sirène)
- INFORMER les populations des centres d'hébergement et prévoir le prépositionnement de matériel dans les sites sûrs
- INFORMER la population à risque de la norme possible d'un système ou d'inondation (Déclencher la sirène et diffuser des informations par mégaphone dans les secteurs à risque)
- DÉCIDER de l'évacuation préventive des zones les plus exposées aux inondations (Ct. Carte)

- POSTE DE COMMANDEMENT
- PRÉVENTION RECONNAISSANCE
- LOGISTIQUE
- POSTE DE COMMANDEMENT
- COMMUNICATION INFORMATION
- POSTE DE COMMANDEMENT

### PLAN D'ACTION

Alerte 1 Cyclonique ou Dépassement des seuils terrain

- MAINTENIR un œil de la situation aux points de repère identifiés sur le carte d'actions
- ALERTE la population à risque de l'inondation d'un système ou d'inondation
- DÉCLANCHER LES SIRÈNES
- DIFFUSER l'alerte dans les secteurs à risque
- OUVRIER ET AGRICHER les centres d'hébergement recensés sur le carte
- FAIRE ÉVACUER la population exposée vers les centres d'hébergement situés à proximité
- SE TENIR INFORMÉ de la situation dans les secteurs à risque

- PRÉVENTION RECONNAISSANCE
- COMMUNICATION INFORMATION
- COMMUNICATION INFORMATION
- COMMUNICATION INFORMATION
- POSTES RECONNAISSANCE
- COMMUNICATION INFORMATION
- POSTES DE COMMANDEMENT

## QUI ?

→ Mobilisation des membres des C.O.U.C et C.O.U.L



### Centre Opérationnel d'Urgence communal ou local

#### POSTE DE COMMANDEMENT

- RAPPEL LOCAL: RNE + Intégration d'un autre RNE
- RAPPEL LOCAL: RNE + Intégration d'un autre RNE

- RNE: Évaluation des besoins et des ressources, et de la situation sur le terrain
- RNE: Évaluation des besoins et des ressources, et de la situation sur le terrain

#### PRÉVENTION RECONNAISSANCE

- RNE: Évaluation de la situation et des ressources, et de la situation sur le terrain
- RNE: Évaluation de la situation et des ressources, et de la situation sur le terrain

#### COMMUNICATION INFORMATION

- RNE: Évaluation de la situation et des ressources, et de la situation sur le terrain
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#### LOGISTIQUE

- RNE: Évaluation de la situation et des ressources, et de la situation sur le terrain
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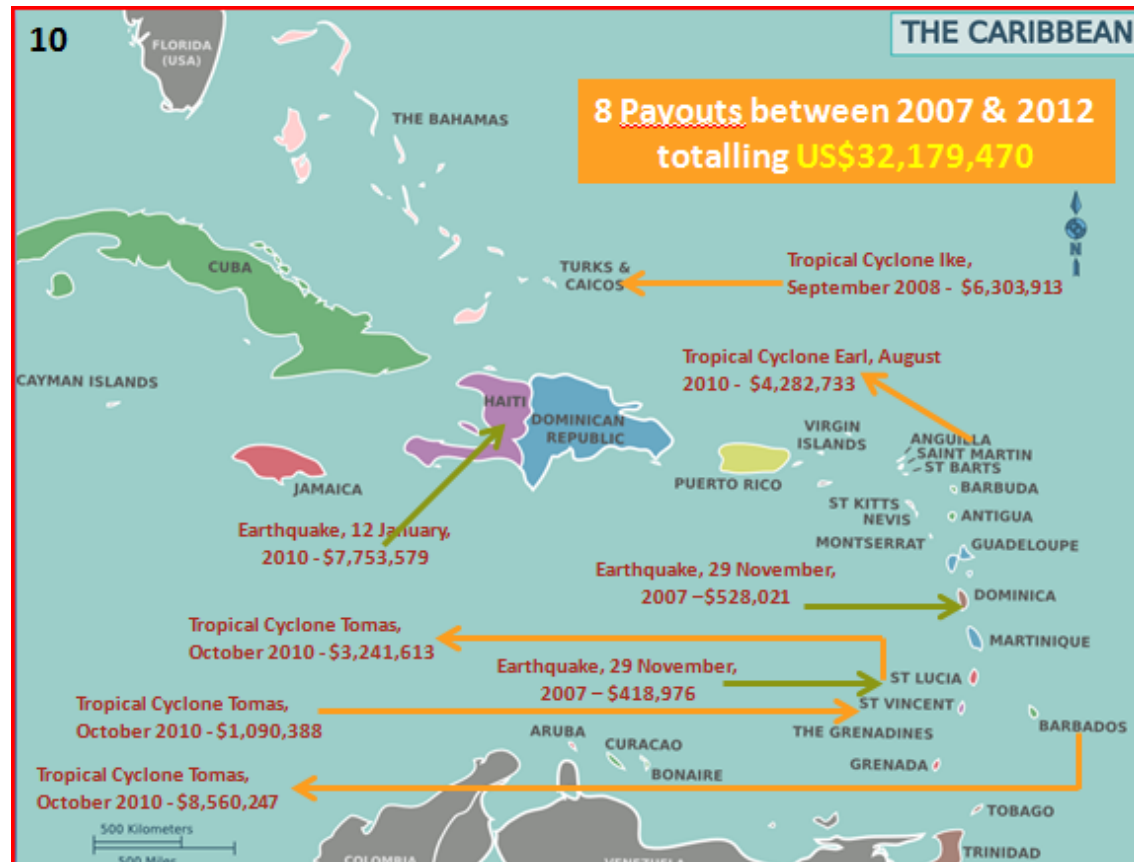
#### POSTES RECONNAISSANCE

- RNE: Évaluation de la situation et des ressources, et de la situation sur le terrain
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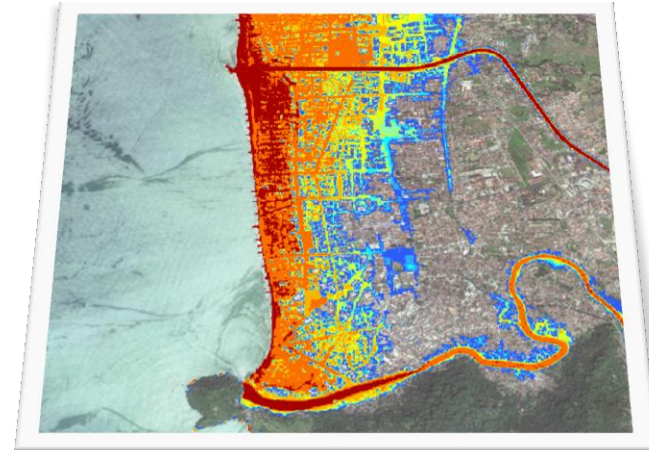
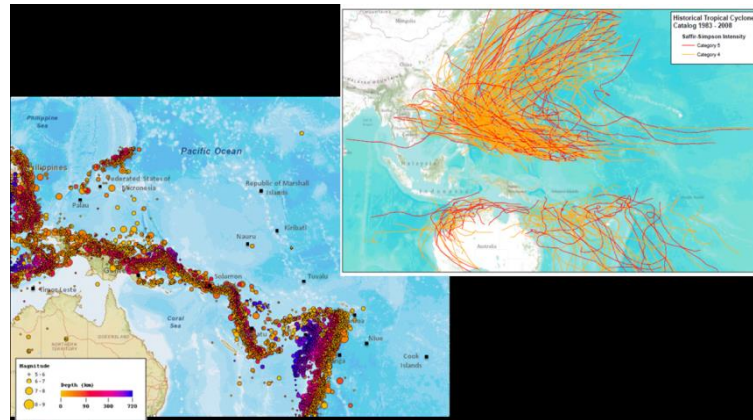
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# Transferring disaster risks – expanding across regions

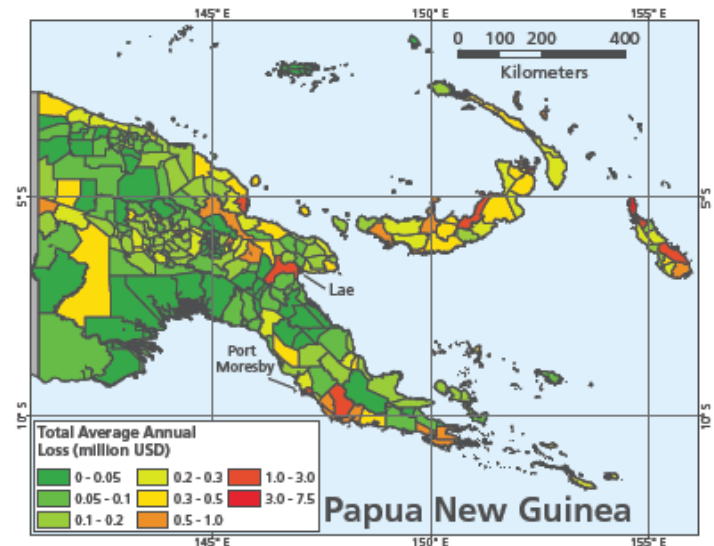
*The model of the Caribbean Catastrophe Insurance Facility (CCRIF), is being replicated in the Pacific and Indian Ocean Island Regions. By pooling the risk across multiple countries, premiums can be lowered. The World Bank Group has supported these initiatives through Technical Assistance and intermediation with reinsurance markets*



# Measuring progress of resilience



- *The Pacific Catastrophe Risk Assessment and Financing Initiative (PICRAFI) has mapped more than 2 million buildings in areas at risk*
- *By monitoring % of population, assets and ecosystems at risk, the progress of resilience can be quantified and measured*



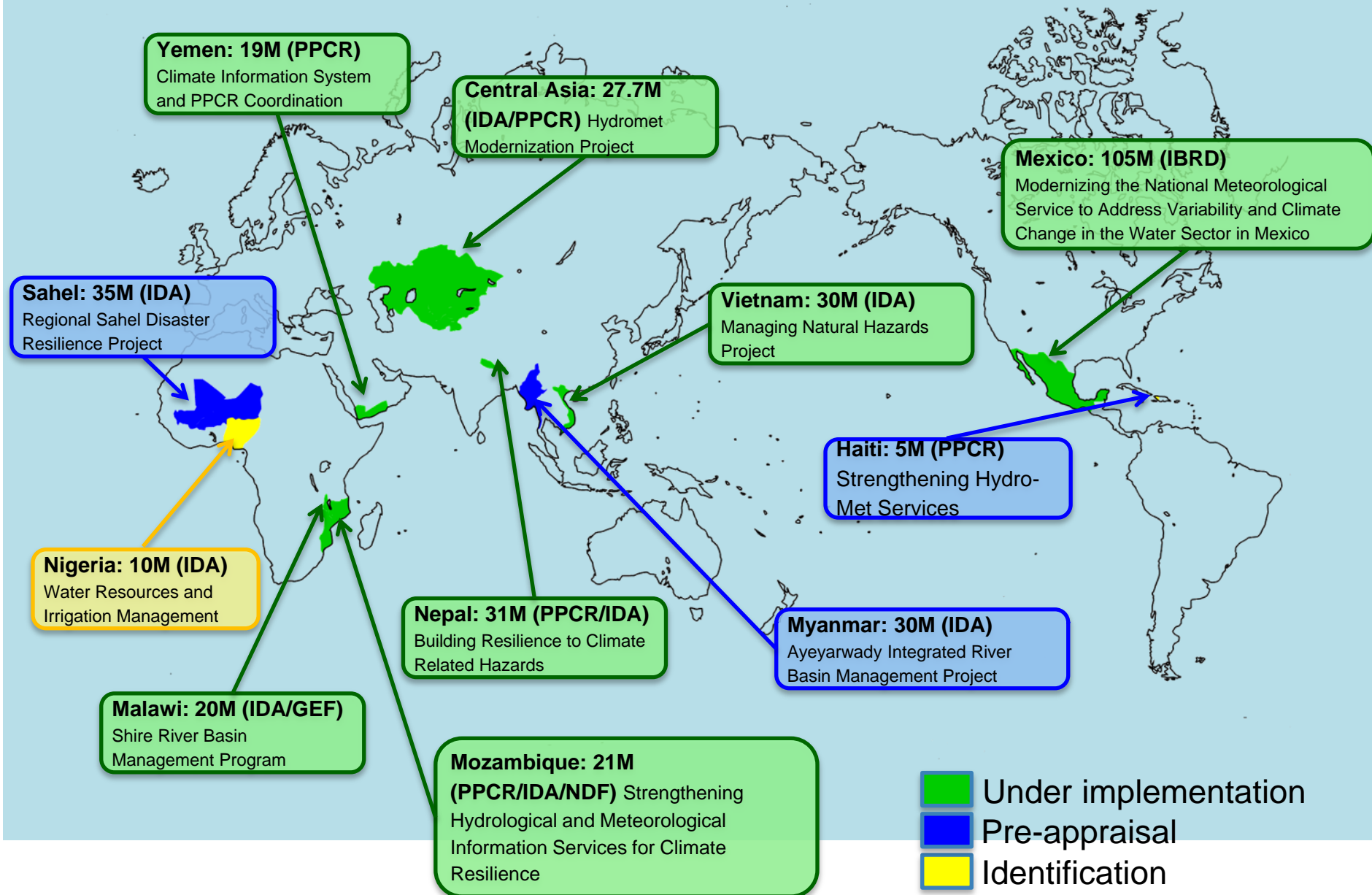
# WB engagement with hydromet services

# Providing vital information to support economic development....

DRM, Agriculture, Water Resources, Transport, Energy, Public Health, Climate Adaptation...



# Some of the ongoing WB Hydromet operations...



# Hydromet: An integral part of DRM and sustainable development

Up to **US\$30  
billion a Year**

in improved global productivity can be achieved with better weather, climate, and hydrological observation and forecasting.

Up to  
**\$2 billion**

in reduced global annual asset losses can also be achieved with better hydromet services, according to the World Bank.<sup>2</sup>

- Since the mid-1980s, prepared and implemented more than 150 operations
- Initial “piecemeal” approach turned more **holistic** in mid-1990s
- Beyond the technical level, the overall goal has become **service delivery** for all end users

**Evaluation of 30 years of WB hydromet projects:** modernization investment must be **substantial** to achieve **transformation**, should encompass three complementary areas:

- 1** **Institutional strengthening**, capacity building and implementation support
- 2** Modernization of **observation infrastructure and forecasting**, including leveraging global and regional opportunities
- 3** Enhancement of the **service delivery system**:

**Engage with WMO and its members from the beginning**

*Photos: Canadian Environmental Assistance*



## Main causes of failure of internationally supported NMHS modernization projects

1. **Lack of understanding** in government and development agencies of the value of NMHS and lack of commitment to maintain NHMS operations
2. Preoccupation with project-time scale installation of hardware without provision for training, maintenance, consumables, and other technical support (**10-15%** of investment budget!)
3. Lack of coordination from different donors and partners
4. Technical complexity

# SOCIO-ECONOMICS DOES MATTER

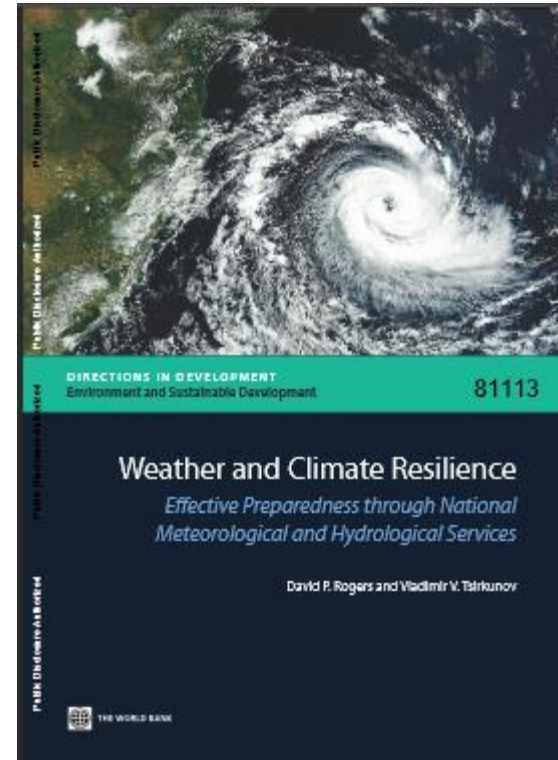
Sustainable operations and financing requires:



- Clear demonstration of the importance of observation and data processing infrastructure
- Rigorous and widely understood demonstration of the socio-economic benefits, both public and private
- Systematic basis for prioritizing the use of available funding for infrastructure and service development and improvement
- Economic evidence for additional investment in climate services infrastructure necessary to support national commitments

# LESSONS LEARNED

- Invest in capacity, from management to technical
- Ensure long-term **operations and maintenance (O&M)** commitment
- Strong **user interface** leads to better and more sustainable services
- User capacity as important as provider capacity
- Prioritize public services – **open data** approach best
- Approach commercial services with great caution
- Leverage and coordinate international and domestic partners
- Need strong and innovative leadership

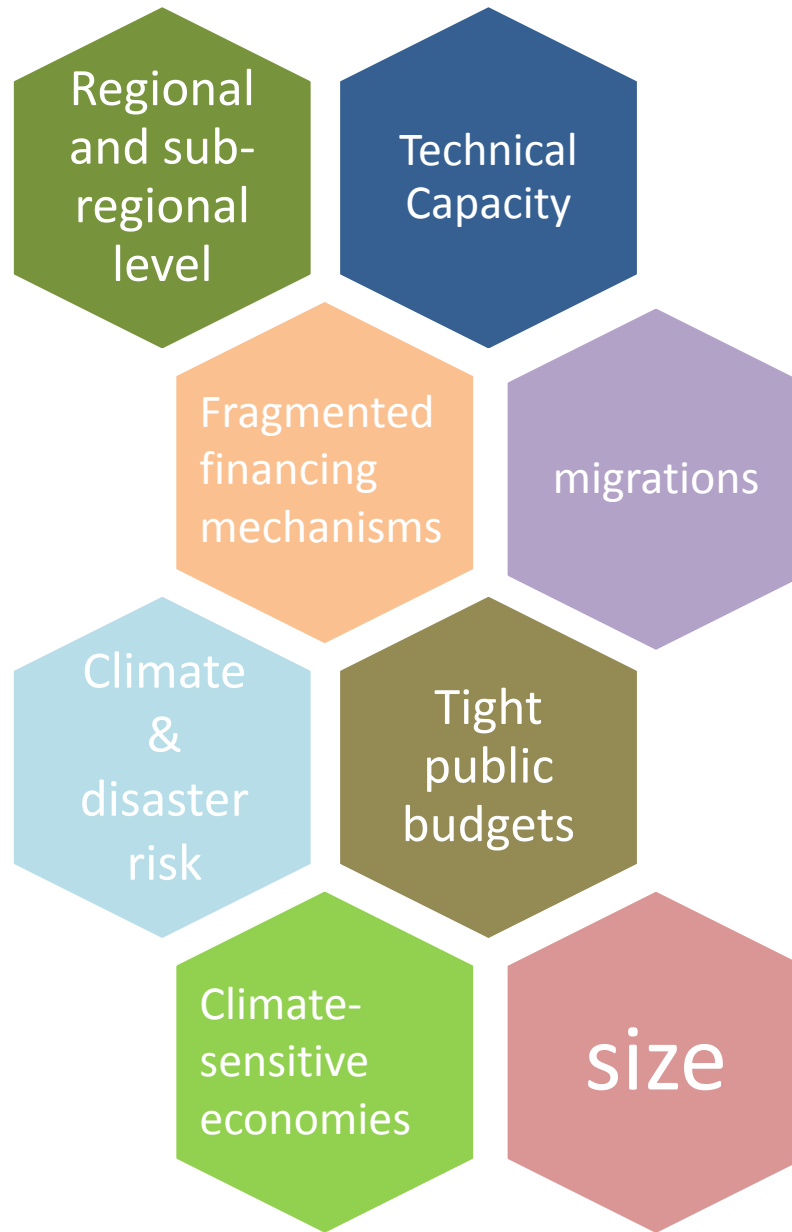


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Global Facility for Disaster Reduction and Recovery

# SIDS challenges...and opportunities



# WB-NMHSs partnership areas

- Integration of hydromet/climate risk management in **country strategies**
- **Raising profile of NMHSs with Ministries of Finance** (strengthening economic argument, policy dialogue on socio-economic benefits, advocacy)
- **Analytical ground work**: institutional and technical assessments of NMHSs
- Identification of comprehensive hydromet modernization programs



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# GFDRR Hydromet program (2011)

**GFDRR Hydromet Program: service center to mobilize resources, guide and support large investments in hydromet modernization. The Program has three pillars:**

- ❖ Capacity Building
- ❖ Analytical Support and Knowledge Management
- ❖ Technical Assistance




*From here...*






*... to something closer to this*



# http://www.gfdrr.org/hydromet


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## Hydromet





**AT A GLANCE**  
**PORTFOLIO**  
The Hydromet Program has three pillars: analytical support and knowledge management; capacity building and technical assistance; and portfolio development and operations.  
**RESULTS**  
The Hydromet Program has supported modernization investments in countries around the world, including Haiti, India, Mozambique, Nepal, Russia, Rwanda, Uganda, and Yemen.

### What We Do

Weather events—including hurricanes, heat waves, cold waves, windstorms, floods, and droughts—cause more economic damage and loss of life than any other type of natural disaster. Weather events, as well as longer-term trends in weather, influence economic development, food security, and health. With a changing climate, these events

  
READ MORE

**Bringing Resilience to Scale**  
In FY14, Mozambique benefitted from a comprehensive risk assessment of schools, resulting in a nationwide investment plan to rehabilitate or build 30,000 classrooms using disaster-proofing guidelines. Honduras...  
02/03/2015

**Shanghai Training on Multi-Hazard Early Warning Systems through South-South Cooperation**  
Effective response to reduce the risk of disasters resulting from hydromet hazards depends on close cooperation between emergency operations, disaster prevention and management specialists, and national...  
10/14/2013

### FEATURED STORIES

#### PUBLICATIONS

##### News, Videos and Events

Events  
[Partner Event] World Conference on Disaster Risk Reduction  
03/14/2015  
News  
Building Resilience to Climate Change - World Bank and AfDB Partner to Improve Hydrological and Meteorological Systems in Africa  
11/28/2014

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# Guiding Principles of GFDRR Hydromet Program

Objective: Enhance capacity of NMHSs to deliver reliable, timely and accurate information and services

- Identify, enable and support investment in hydromet services (NMHSs)
- Facilitate integrated approach with focus on institutional strengthening and capacity building, modernization of observing infrastructure and forecasting, and enhanced service delivery system
- Facilitate more effective partnerships with WMO, IFIs, leading NMHSs and donor community
- Jointly with WMO provide better access to global products, best practices and expertise
- Ensure alignment with Global Framework for Climate Services (GFCS) and other global initiatives
- Provide access to funds for operational guidance and support through “twinning arrangements” with leading NMHSs and WMO
- Secure government commitment to increase NMHSs sustainability

# Strengthening Hydromet Services in Haiti





Limnimètre automatique /  
limni + pluvio auto



Limnimètre manuel



Pluviomètre automatique/  
station complète

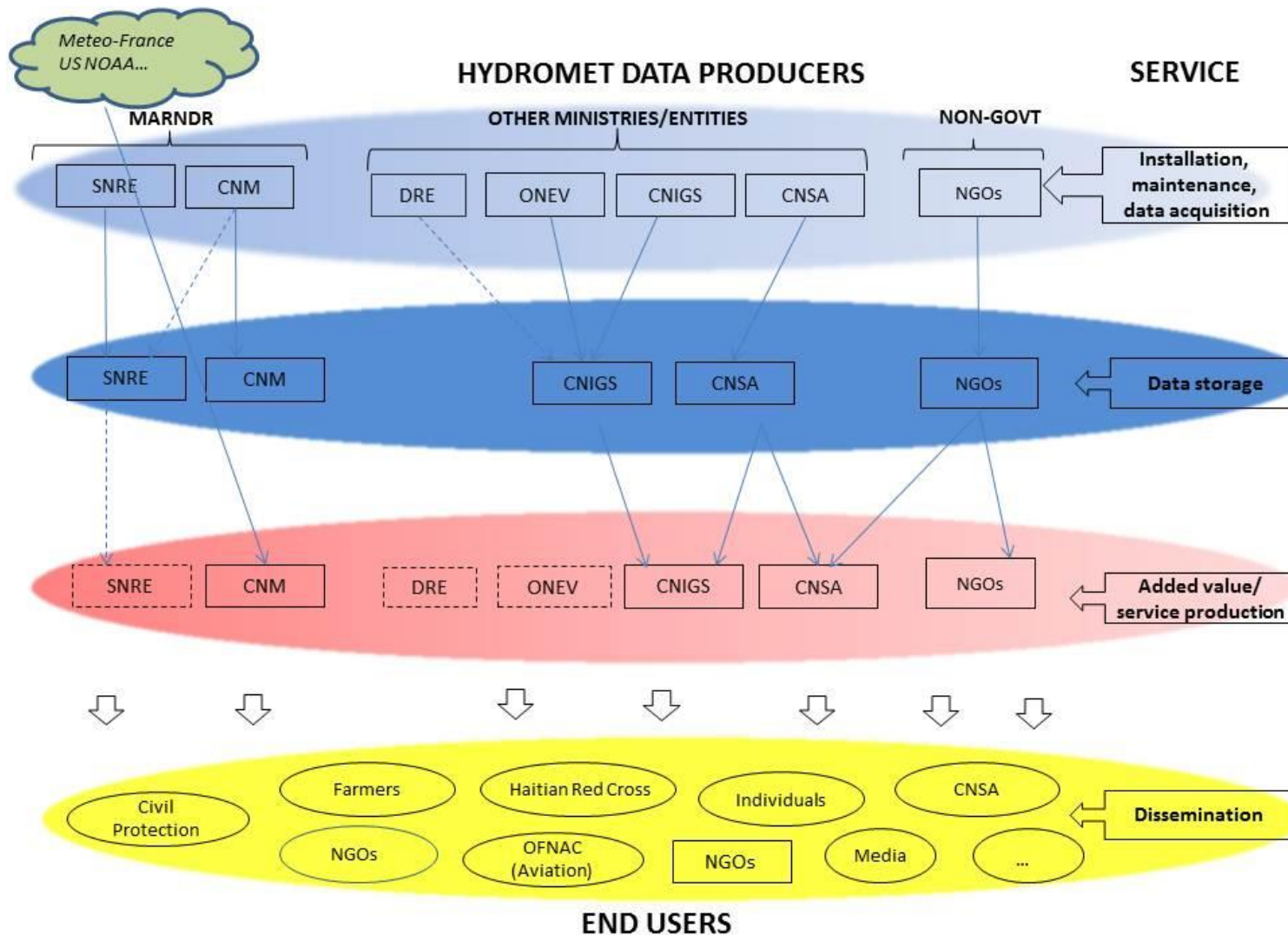


Pluviomètre manuel

From USEPA ORSD – USDA ARS

Haiti

# Hydromet institutional analysis



# Haiti Hydromet Strengthening Project (2015-2020)

NN	Components/Sub-Components	USD(M)
A	<b>Component A: Strengthening hydromet institutions and national data collection system</b>	<b>3.0</b>
A.1	<b>Support to institutional reform; capacity and partnership development</b> <ul style="list-style-type: none"> <li>❖ Long-term strategy based on sustainable financing and staffing model</li> <li>❖ Training and knowledge exchange programs for capacity development in hydromet data management</li> <li>❖ Development of applications and applied research programs</li> </ul>	<b>1.4</b>
A.2	<b>Strengthening inter-institutional data sharing and coordination</b> <ul style="list-style-type: none"> <li>❖ Development of a central platform for integration of data from all stations</li> <li>❖ Development of customized user interfaces</li> <li>❖ Training and support on the use of the information platform</li> <li>❖ Optimization of the hydrological and meteorological network (repairs, replacement and maintenance of equipment) + <u>government co-financing for maintenance</u></li> <li>❖ Inter-ministerial coordination of the hydromet platform</li> </ul>	<b>1.6</b>

## Haiti Hydromet Strengthening Project (2015-2020)

NN	Components/Sub-Components	USD(M)
B	<b>Component B: Identify hydro-meteorological and climate services' requirements for select end-users and developing information services to support decision making</b>	<b>1.4</b>
B.1	Systematically scope needs for end-user groups (parameters, spatial resolution, frequency of data updates, required format for access, dissemination channels)	0.2
B.2	Update and implement operating procedures for the use of hydromet services for <u>agricultural and food security</u> purposes (agri-met information services)	0.4
B.3	Update and implement operating procedures to ensure that hydromet services contribute to Early Warning Systems (EWS) of the <u>Civil Protection</u>	0.4
B.4	Update return period of selected hazards in order to enable mainstreaming climate variability and change into development processes and <u>infrastructure design</u>	0.4

## Haiti Hydromet Strengthening Project (2015-2020)

NN	Components/Sub-Components	USD(M)
C	<b>Component C:</b> Support to project implementation	<b>0.6</b>
C.1.	Coordination, monitoring and evaluation, procurement, financial management, safeguards, communication	

# Thank you

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