



An EPIC Response:

Innovative Governance for Flood and Drought Risk Management



World Bank



Greg Browder



Brenden Jongman



Nathan Engle



Stephen Hodgson



Melissa Castera Errea

Deltares



Ana Nuñez Sanchez



Eelco Van Beek

Hydro-Climatic Risk Management

Each Climate Type Has Its Own
Unique Flood and Drought
Challenges
But There are General Principles
That Apply Everywhere



Tropical
Monsoon and
Savannahs



Hot Deserts



Humid Subtropical



Mediterranean

The EPIC Response Framework

PROGRAM AREAS

ENABLE

- National Frameworks: Laws, Agencies, Strategic Plans
- Facilitating Whole-of-Society Approach
- Hydro-Met Services

PLAN

- Flood and Drought Risk Mitigation and Contingency Planning

INVEST

- Healthy Watershed
- Water Resources Infrastructure

CONTROL

- Water Allocation and Groundwater Management
- Floodplain Management

RESPOND

- Drought Monitoring, Response, and Recovery
- Flood Monitoring, Response, and Recovery
- Disaster Risk Financing

IMPACT

The EPIC Response Framework

Level 1 EPIC Response Principles	Level 2 Chapters/Program Areas	Level 3 Programs
Enable	National Sectoral Frameworks	Water Resources Management
		Disaster Risk Management
		Drought Risk Management
		Flood Risk Management
	Whole-of-Society Approach	Local Government
		Public Participation & Stakeholder Engagement
		Social Inclusion
		Education & Risk Communication
		Scientific Collaboration
	Hydrological and Meteorological Services	Open Data
		National Framework for NMS/NHS Services
		National Water Data Program
		Drought Monitoring and Impact Assessment
		Flood Forecasting and Warning
		Agrometeorological Advisory Services
Plan	Flood and Drought Risk Mitigation and Contingency Planning	National Climate Assessment
		Integrated River Basin Planning
		Coastal Zone Management Planning
		Urban Water Supply Planning
		Irrigation Water Supply Planning
		Local Flood Risk Mitigation Planning
Invest	Healthy Watersheds	Agriculture Policies and Climate-Smart Agriculture
		Forest Management
		Wetlands Management
		Local Watershed Management Organizations
	Water Resources Infrastructure	Watershed Planning
		Water Resources Investment Policy
Control	Water Allocation and Groundwater Management	Dam Safety
		Flood Infrastructure Safety
	Floodplain Management	Flexible Water Allocation
		Conjunctive Groundwater Management
		Floodplain Mapping
		Floodplain Regulation
Respond	Drought Monitoring, Response, and Recovery	Local Flood Mitigation Planning
		Drought Monitoring Program
		WRM Drought Response
	Flood Monitoring, Response, and Recovery	Agriculture Drought Response
		Social Protection Drought Response
		Flood Forecasting and Warning
		Flood Emergency Preparedness, Response, and Relief
	Disaster Risk Financing	Flood Disaster Recovery
		Disaster Risk Financing Instruments
		Disaster Risk Financing National Sector Framework

Agencies Must Fulfill Their Specific Mandates but Also Need to Collaborate To Achieve an EPIC Response

National Agency Roles for Hydro-climatic Risk Management

Hydromet

Provides information for water resources and floodplain management. Leads flood and drought forecasting. Supports agriculture with agro-hydro advisory services.

WRM

Oversees planning and operation of water resources infrastructure. Regulates water allocations and strategic use of groundwater to help mitigate droughts. Key role in flood and drought response.



DRM

Lead coordinating agency for flood, and sometimes drought, disaster response. Provides leadership in floodplain management. Works with other agencies to mitigate risks.



Agriculture

Promotes healthy watersheds through sound agricultural policies and climate-smart agriculture. Helps boost farmer incomes and resilience. Key role in drought response. Collaborates with natural resources and WRM on watershed management

Natural resources management

Promotes healthy watersheds by sustainably managing forests, wetlands, and coastal barriers. Collaborates with agriculture and WRM on watershed management.

Developing an EPIC Response is an Evolutionary Process:

- Continuously strive to improve program performance through rigorous monitoring, evaluation, and adjustments.
- Periodically formulate interlocking, national strategic plans for water resources, disaster risk management, drought management, and climate adaptation.

Generic Development Tables for 40 Different Programs

Nascent	Engaged	Capable	Effective
No legal framework or formal program. <i>Ad hoc</i> approach	Legal framework authorizes the program, but program not yet operational	Program is operational but still in early stages of implementation	Legal framework has been refined based upon experience, with mature program implementation

Developing an EPIC Response is an Evolutionary Process:

Depends on economic development and quality of governance

Dimension	Nascent	Engaged	Capable	Effective
National laws and policies	No drought law or policy adopted.	No drought law, but sector laws incorporate drought mandates.	National drought law adopted.	Well-established drought law or policy with evolutionary amendments.
National agencies	No drought committee in place.	<i>Ad hoc</i> drought coordination committees convened during droughts.	Multi-disciplinary Drought Committee established.	Drought Committee functioning well, with effective working groups and interagency cooperation.
National Strategic Plan	No Plan.	Drought emergency response plans only.	Basic drought preparedness and response plan but primary focus on monitoring and response. Limited coordination and low implementation.	Comprehensive Plan covering all three drought pillars with high level of implementation.

TABLE 6.1 Generic Evolution of River Basin Plans Incorporating Flood and Drought Risk Management

Nascent	Engaged	Capable	Effective
No water resources law in place and so no river basin plans are prepared. Water resources development and management takes place in an <i>ad hoc</i> and uncoordinated manner.	Water resources law in force that requires preparation of basin plans. Several plans prepared but without involvement of stakeholders, and do not comprehensively address flood and drought risk management. No linkage with water use (urban and agriculture) or local flood plans.	Basin plans promote stakeholder engagement through formal mechanisms, such as basin committees or authorities. Drought and flood risk management are incorporated into basin plans or undertaken in a parallel process. Some linkage with water use (urban and agriculture) and local flood plans.	Basin plans formulated with active engagement by all stakeholders through formal mechanisms. Adaptive planning process utilized. Standalone basin flood management and drought management plans prepared and integrated into overall basin plan. Close linkages with water user and local flood plans.