



An EPIC Response:

Innovative Governance
for Flood and Drought
Risk Management



Deltares

EPIC Response Framework

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World Bank

Principle 1 Agency Collaboration “Joined Up Government”

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.



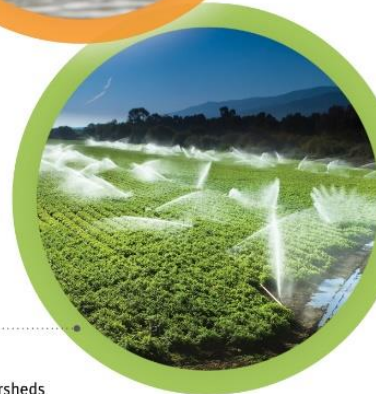
WRM

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.

Principle 2
Agencies Must
Mobilize
Whole of Society



Local government



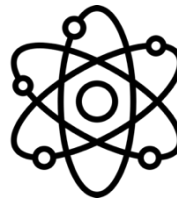
Public participation



Social inclusion



Education and risk
communication



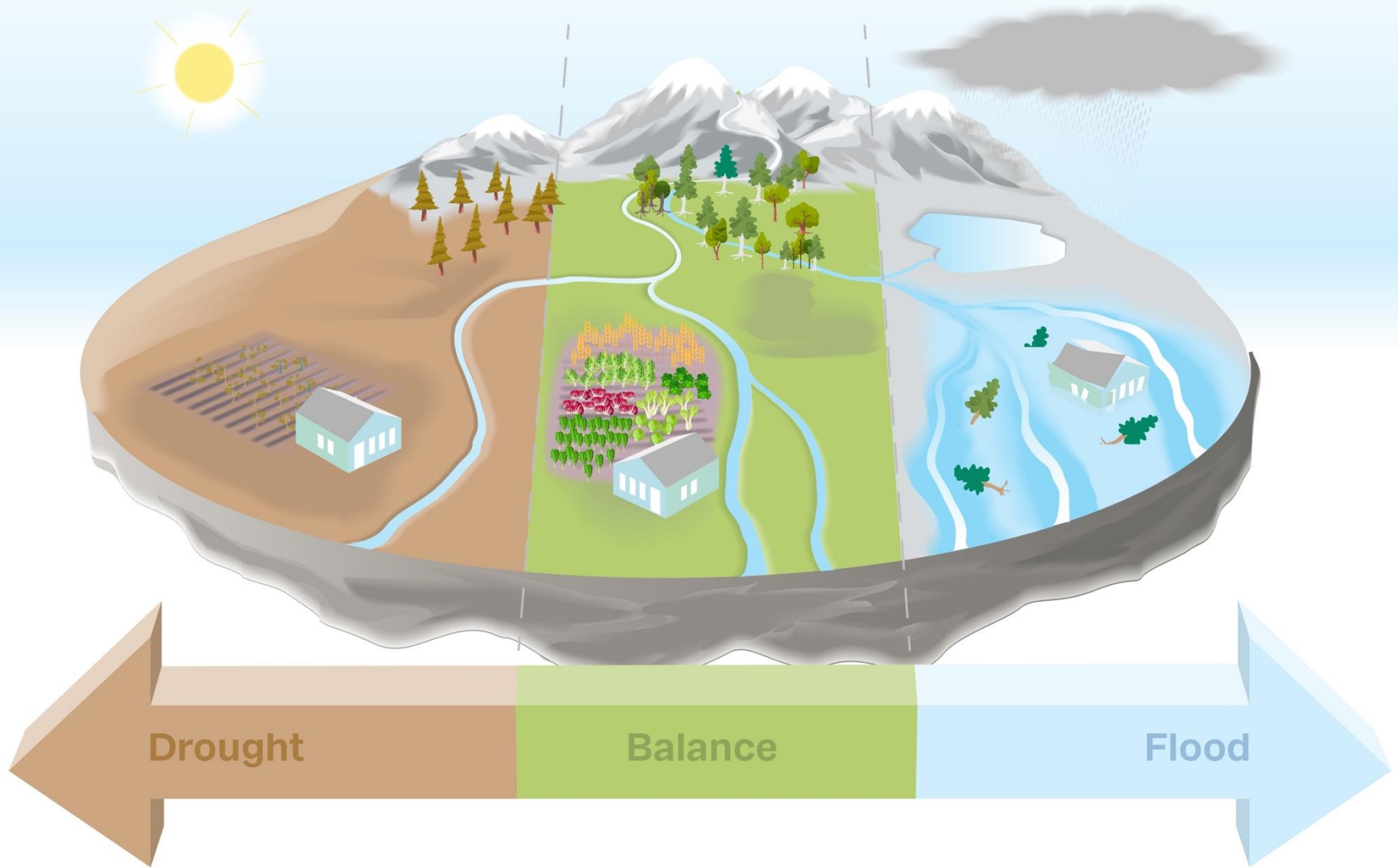
Scientific
collaboration



Open information

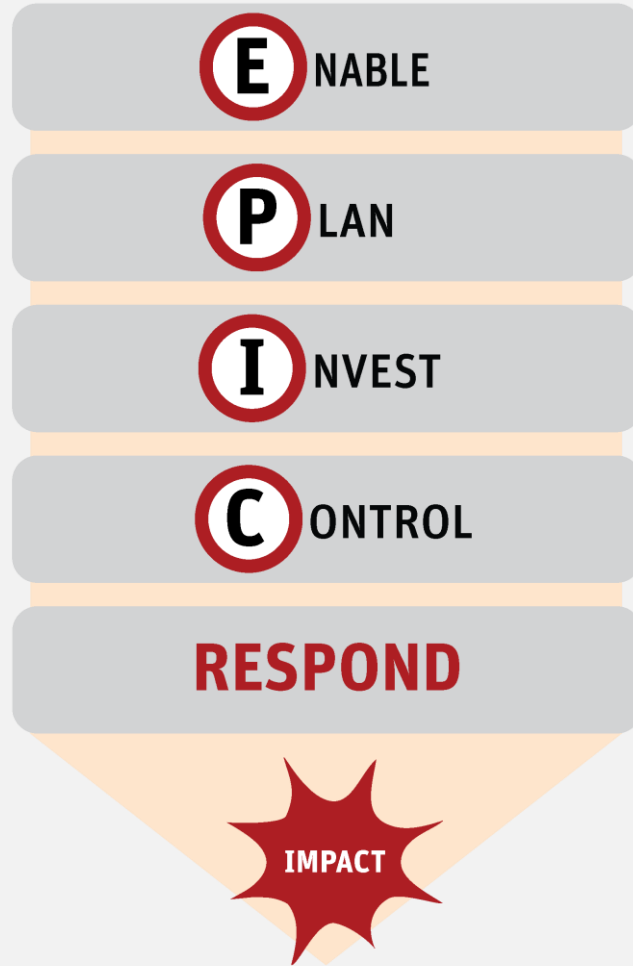
Principle 3

Hydro-Climatic Spectrum



The EPIC Response Framework

PROGRAM AREAS



Programs for Disaster Response and Recovery

Immediate Imperative

ENABLE

PLAN

INVEST

CONTROL

RESPOND

IMPACT



Programs for Controlling Land and Water Use: Reduce Exposure and Vulnerability

ENABLE

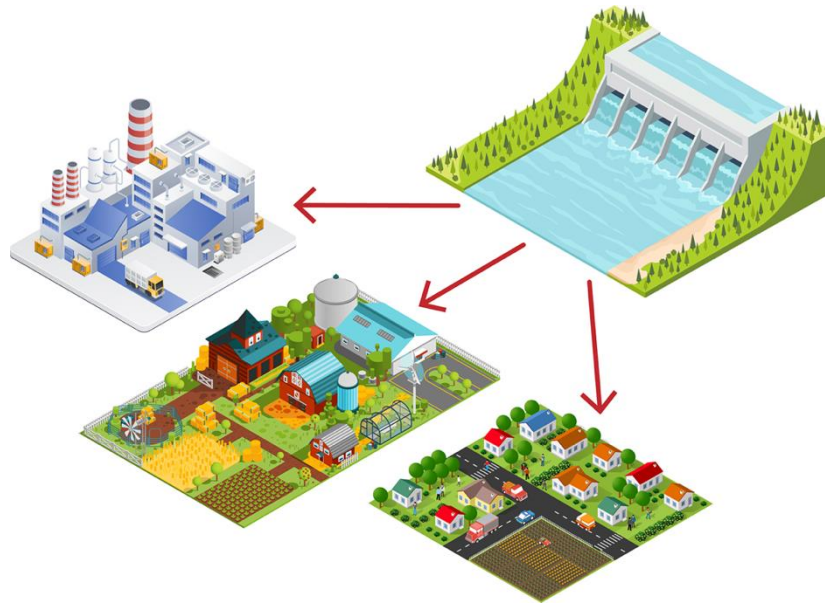
PLAN

INVEST

CONTROL

RESPOND

IMPACT



Programs for Investing in Green and Grey Infrastructure: Reduce Hazards

ENABLE

PLAN

INVEST

CONTROL

RESPOND

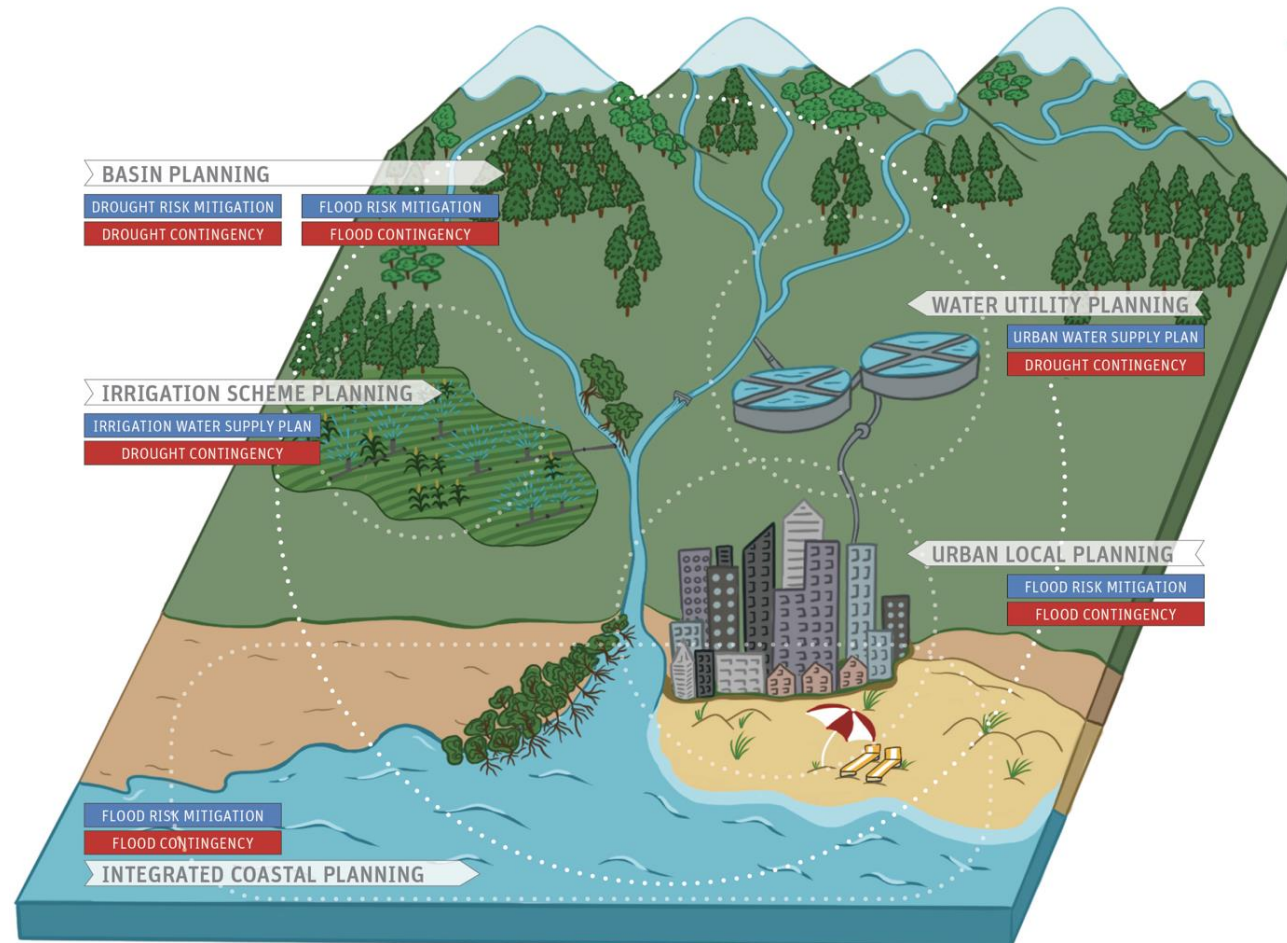
IMPACT



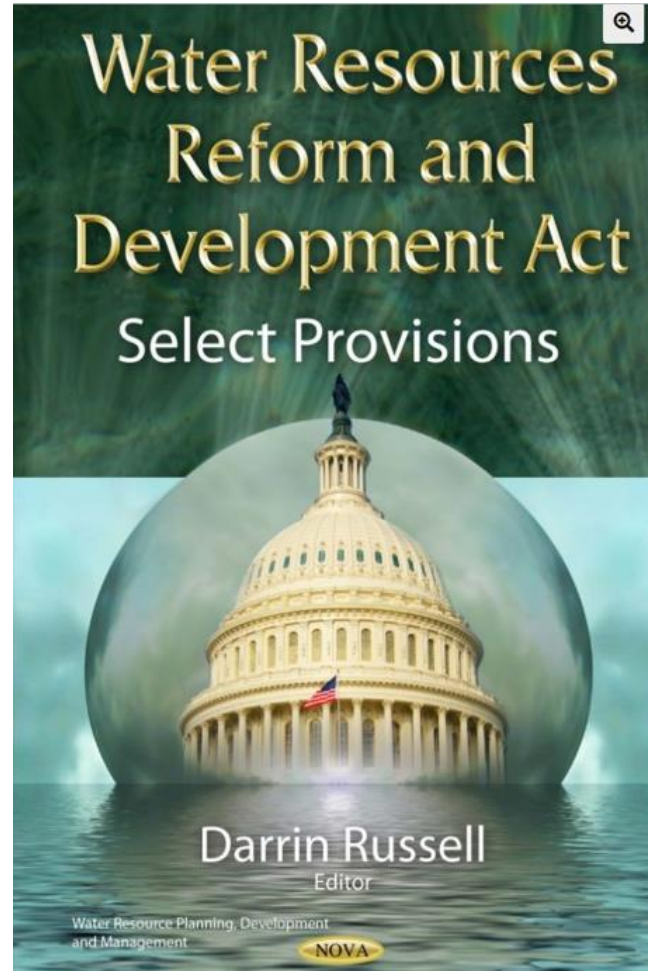
Programs for Planning at Multiple Nested Levels: Smart Investments and Land& Water Control



FIGURE 5 Overview of Plans for Hydro-Climatic Risk Management



Enabling Policies, Laws and Information: Enhances Every Level



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 Full Program List

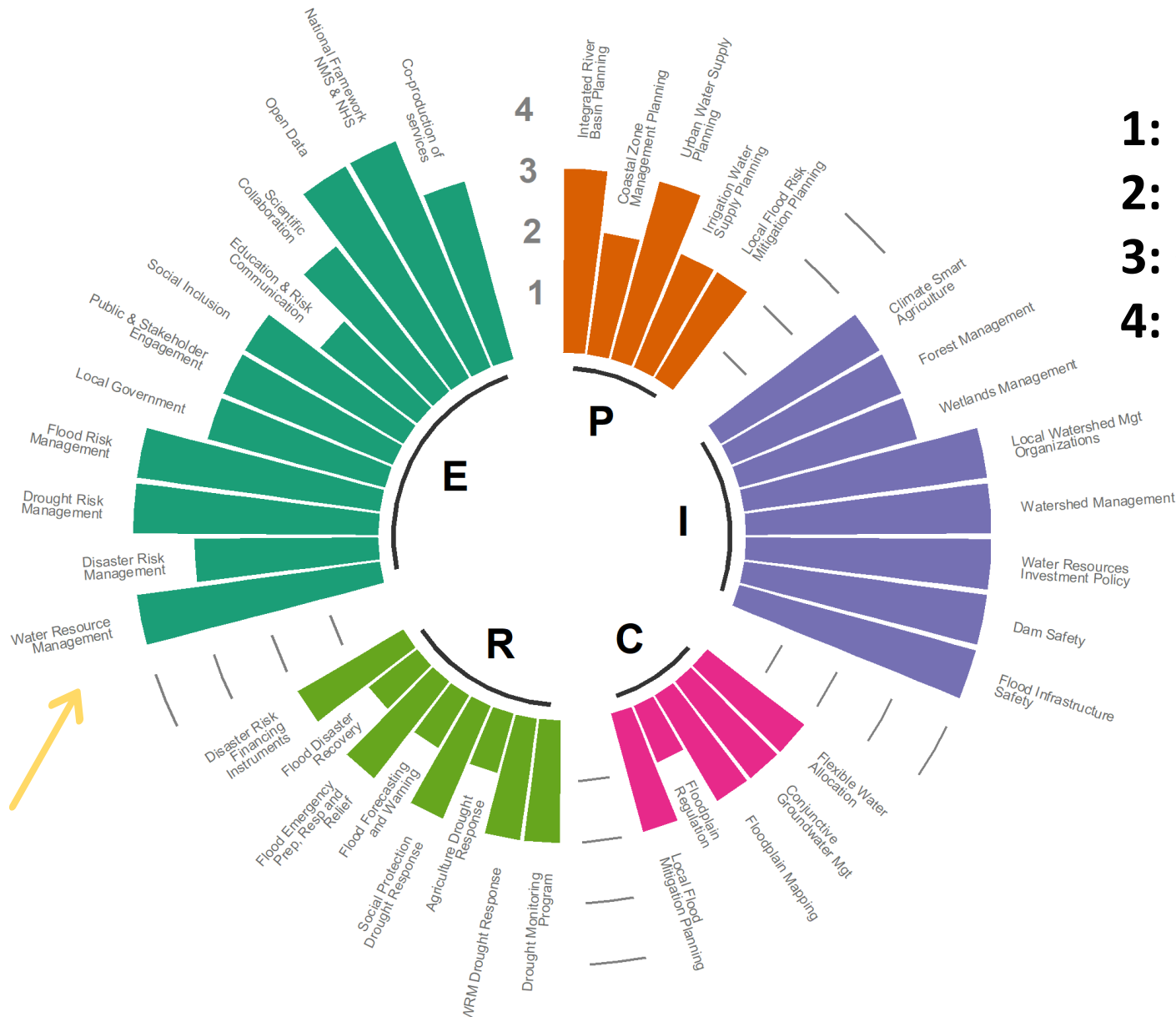
Level 1 EPIC Response Principles	Level 2 Chapters/Program Areas	Level 3 Programs
Enable	National Sectoral Frameworks	Water Resources Management
		Disaster Risk Management
		Drought Risk Management
		Flood Risk Management
	Whole-of-Society Approach	Local Government
		Public Participation & Stakeholder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

EPIC Response Process is Evolutionary

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

Assessing Governance Using EPIC Response

1: Nascent
2: Engaged
3: Capable
4: Effective



EPIC Response Core Principles

- **Joined Up Government Response**
- **Whole-of-Society Effort**
- **Manage Floods and Droughts Together**