

Adaptation Policies and the Application to Urban Development in South Asia

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Contents

- ADB's adaptation program
- Coastal Towns Environmental Infrastructure Project, Bangladesh
- Approach to urban adaptation
- Analysis of flood management measures in Bangkok, Thailand
- Lessons and conclusions

ADB's Adaptation Program

- Climate risk management
- Knowledge and capacity
- Networks and partnerships
- Adaptation finance



Climate Risk Management

- Institutionalized climate risk screening
 - AWARE tool rolled out (38 projects)
- Financial Support
 - Climate Change Fund (\$4 million)
- Technical Support



Technical Guidance

Available

- Transport
- Energy
- Agriculture
- Sector briefings

Forthcoming

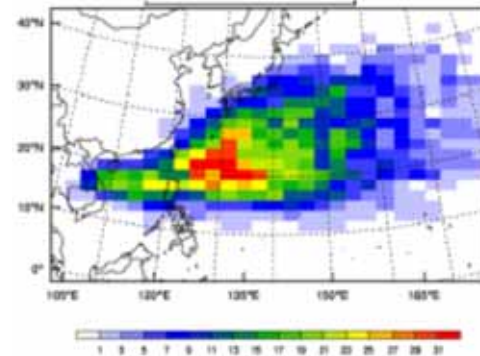
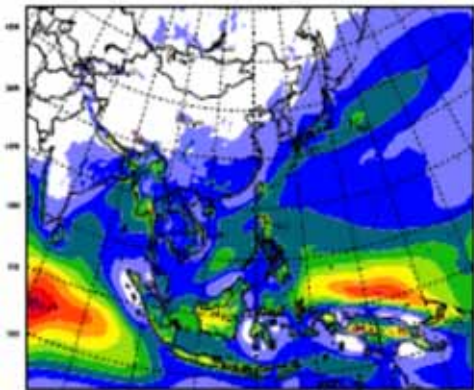
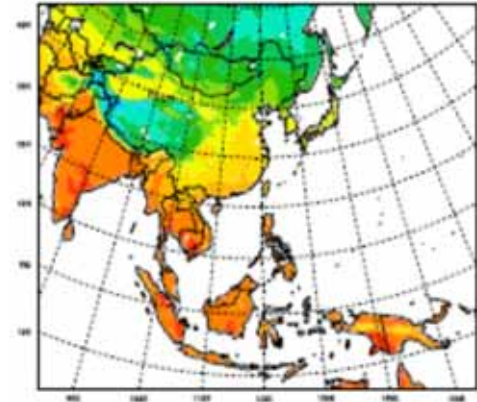
- Transport Case Studies
- Water Resource Management
- Economics of Climate-proofing
- Lessons Learned



Available at: <http://www.adb.org>

Develop Knowledge and Capacity

- Regional Public Goods Approach
- High Resolution Climate Projections and Evidence Base
- Institutional capacity



Networks and Partnerships

- Asia Pacific Adaptation Network
- USAID ADAPT-Asia
- Regional Climate Consortium
- Climate Investment Funds
- MDBs Group on Climate Finance Tracking



Adaptation Financing

- Almost \$1 billion in 2013
 - \$24.5 million from GEF
 - \$426 million from PPCR
- \$140 million for resilient cities
- \$7.4 million for private sector
- Contributes to design of GCF



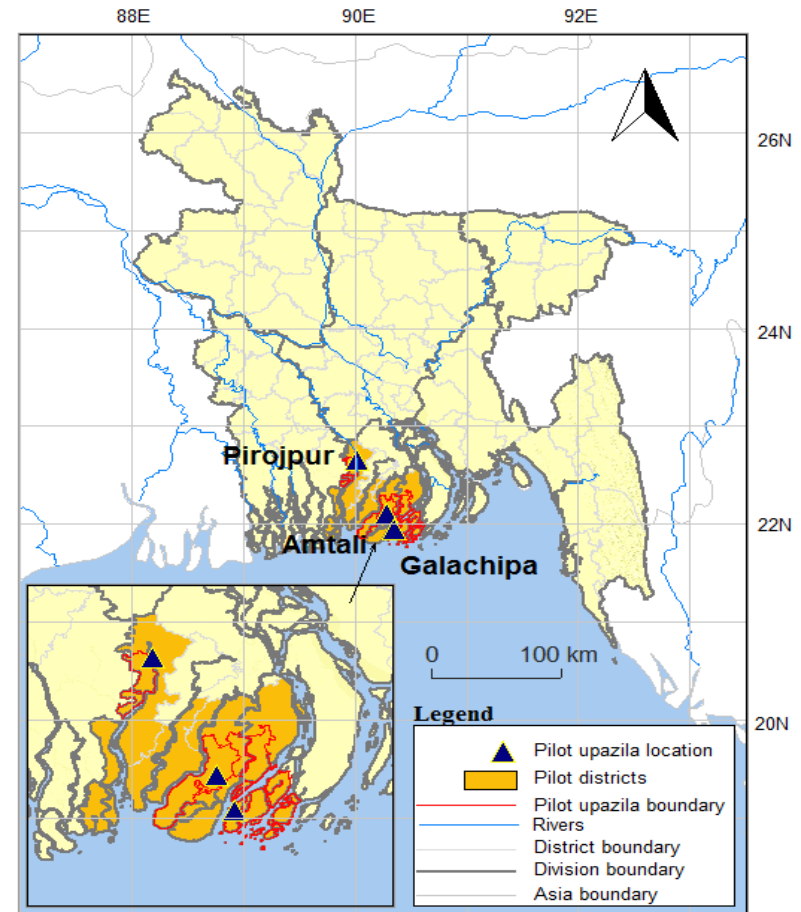
Coastal Towns in Bangladesh

Key climate vulnerabilities

- Cyclones, storm surges and extreme rainfall events;
- drainage congestion;
- saline water intrusion;
- and changes in coastal morphology

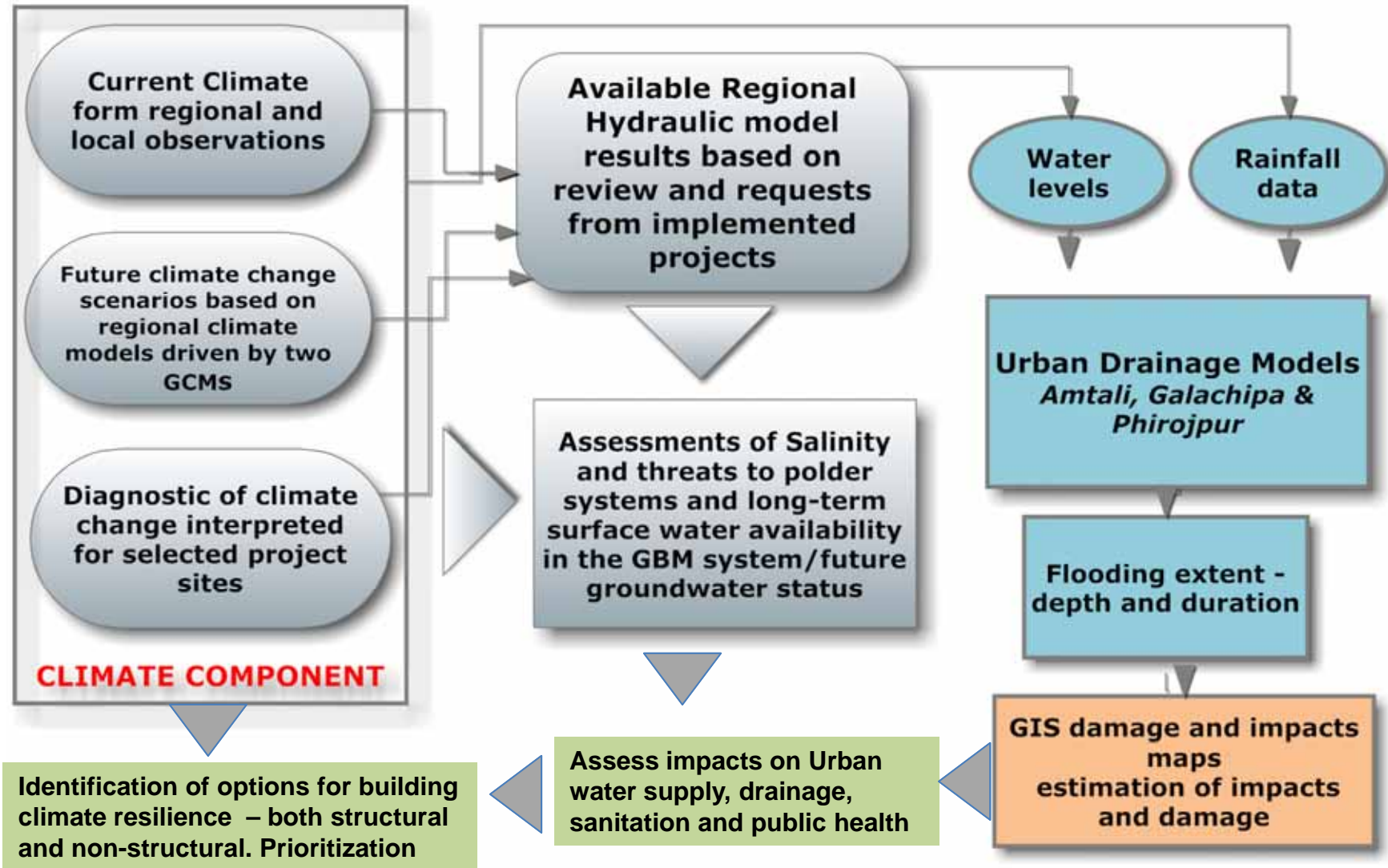
Coastal Zone Issues (NAPA, 2005)

	Area	Population
Amtali	8.92 sq. km	17, 311
Galachipa	3.39 sq. km	21,200
Pirojpur	29.50 sq. km	60,056

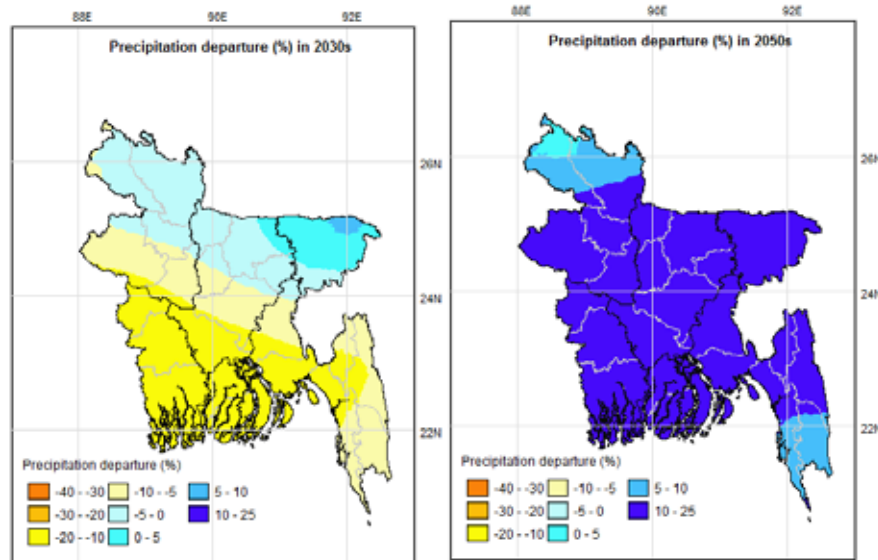


Japan
Fund for
Poverty
Reduction

Framework for Analysis



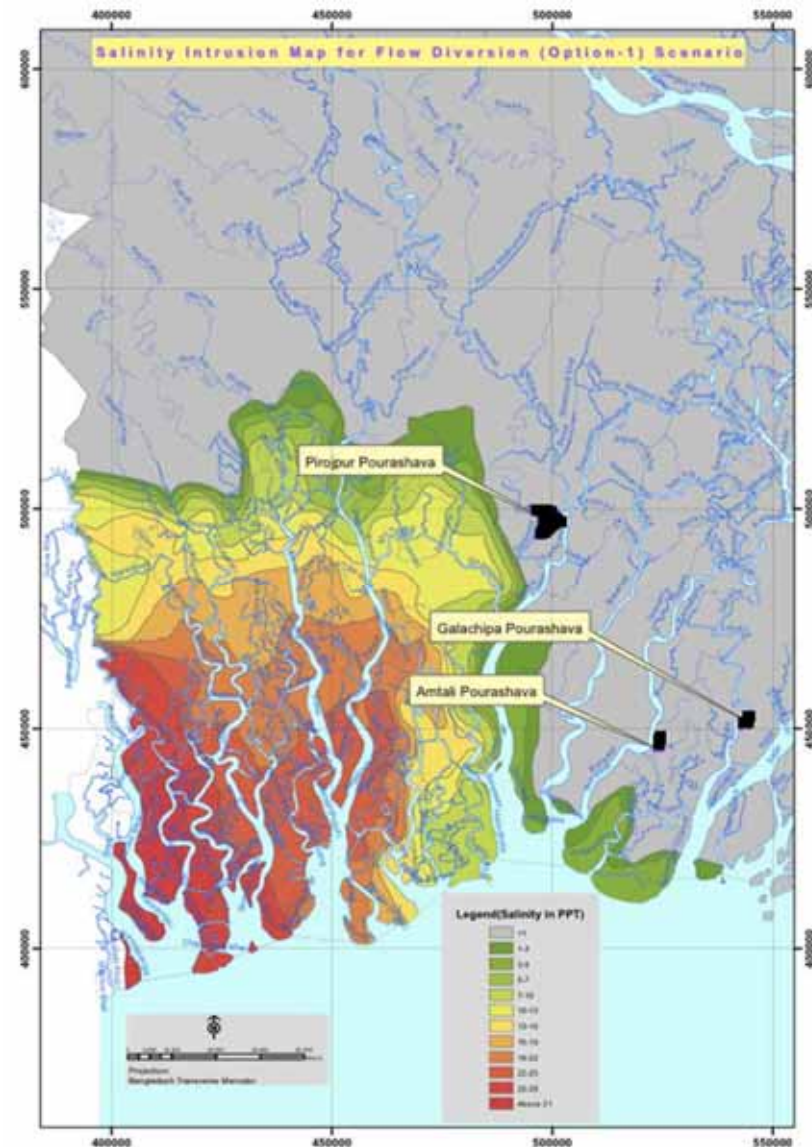
Future Climate Change Scenario in Southern coastal area



- Increasing temperatures $\sim +1.5$ to 4 C increase in temperatures by the 2050s is projected over the southern coastal region.
- Increasing monsoon season rainfalls over Ganges-Brahmaputra-Meghna (GBM) basin.
- Increasing rainfall during the monsoon season (about 10-15%); Likely increases in daily rainfall intensities
- Cyclone frequencies not indicating increases
- Global sea-level projections used

Climate Impacts on Water Supply

- **Source**
 - Surface water: Low flows, salinity, floods, river channel morphology
 - Ground water: resources, salinity, contamination
- **Distribution**
 - Network extension to serve more users
- **Infrastructure** (pumping, water treatment plant, electricity)
 - to be secured
- **Consumption**
 - Projections of future growth and development
 - Increase in demand



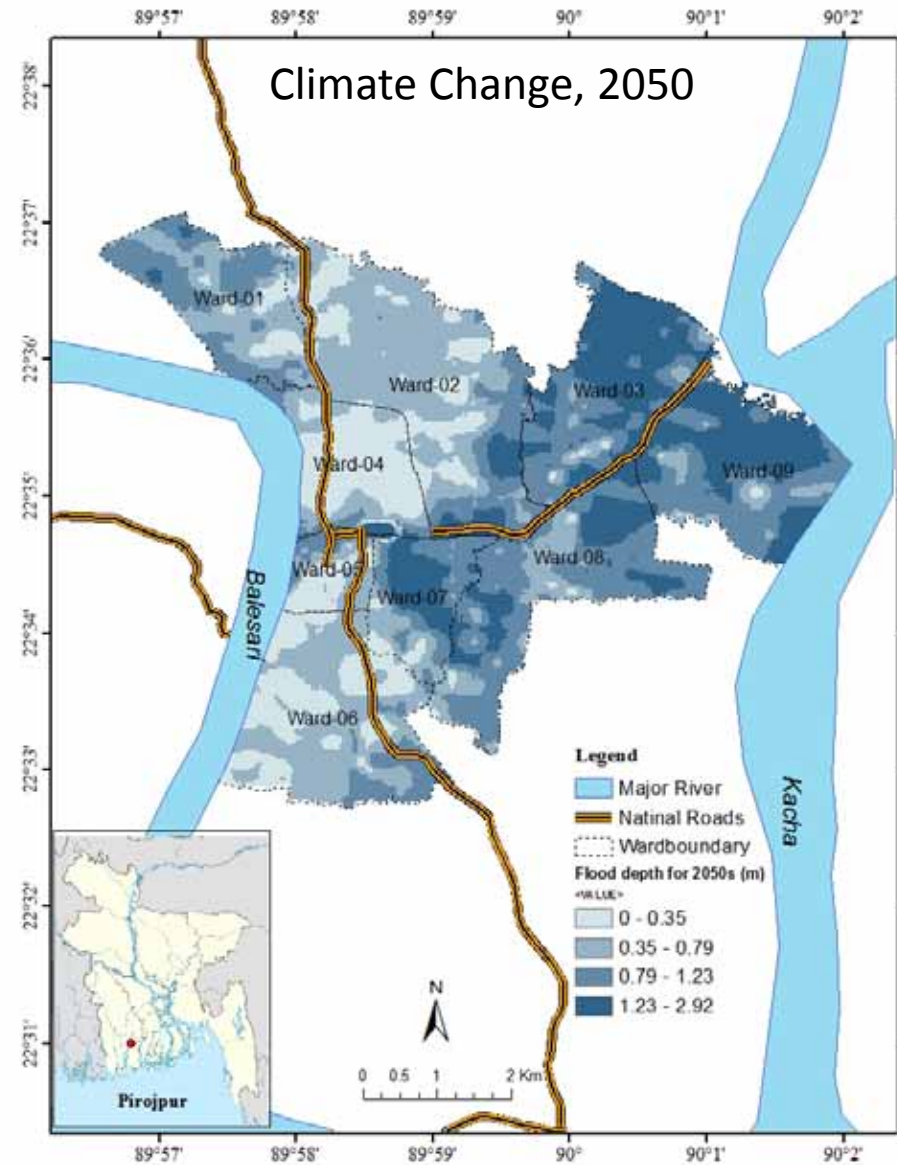
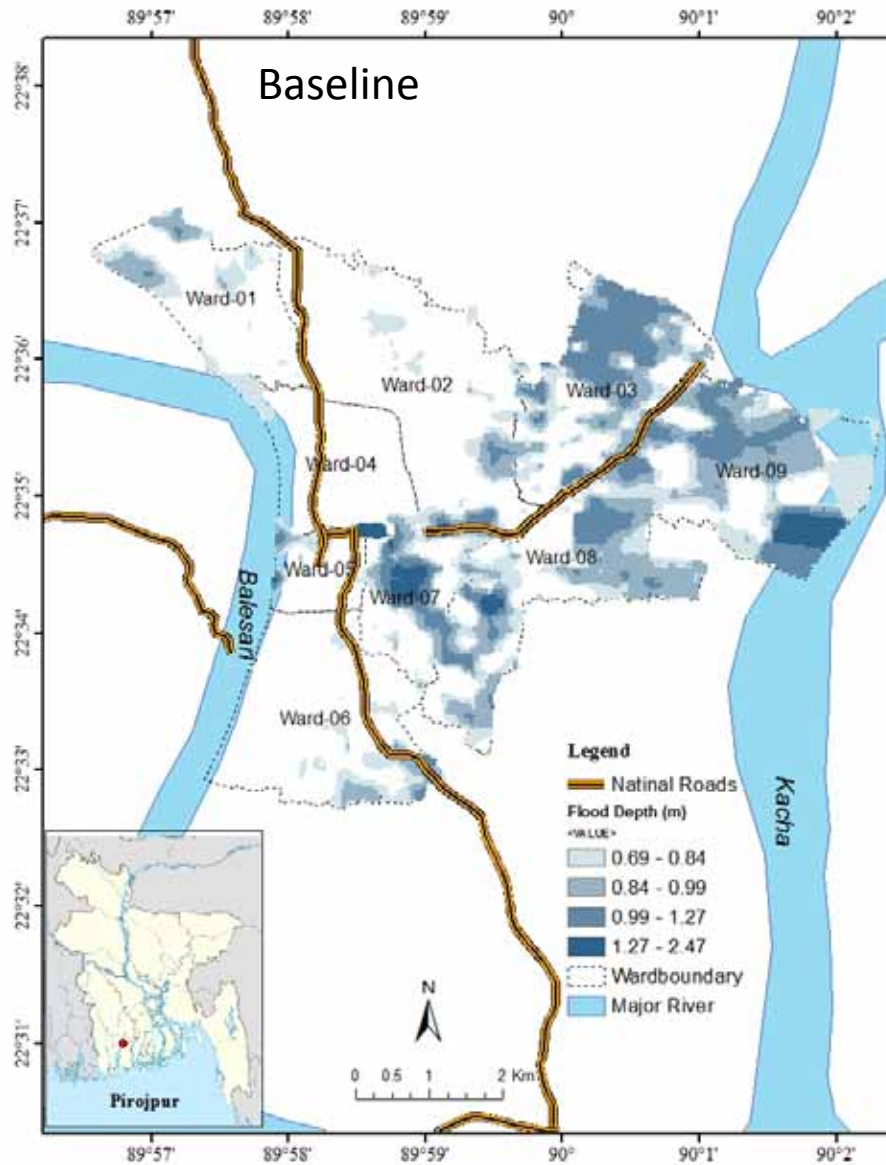
Climate Impacts on Urban Drainage

- ***Flows within townships***
 - Urban drains (*pucca*); secondary drains; tertiary *khals*
- ***Outflows to rivers and sea***
 - sluice gates (regulators)
- ***Urban catchments***
 - Land-use, high run-off



Impacted by higher daily rainfall, river flooding, tidal flow increase due to increase in sea-levels and storm surge

Inundation map – Pirojpur



Water Supply adaptation options

- ***Structural***
 - Deep-ground water as drinking water source is a climate resilient option; with careful management
 - increasing the capacity of surface-water treatment works (Salinity will be still within acceptable levels.)
 - Creating additional storage
 - Rainwater harvesting
 - Protecting water supply, electricity supply in flood prone areas
- ***Non-structural***
 - Improve water supply monitoring and management at municipal level; monitoring of groundwater
 - Awareness about climate change issues, community involvement in preservation of natural water bodies
 - Enhance disaster management – preparedness and response with respect to water supply

Drainage & flood control adaptation options

- ***Structural***

- Additional drainage as identified by modelling to be constructed to overcome additional flooding from climate change
- re-excavate/clear Khals, beels and drains
- additional sluices needed to remove flood waters
- Solid waste management to prevent drains being blocked
- Raise embankments to protect from river floods
- Cyclone shelters

- ***Non-structural***

- Awareness campaigns to prevent encroachment of drains and Khals
- Land-use plans as per master plans being formulated to be strictly implemented to protect encroachment on drainage system
- Enhance disaster management teams – preparedness and response, water supply in cyclone shelters – rapidly deployable water treatment systems

Approach to Urban Adaptation

- Climate-proofing urban infrastructure (e.g., bigger road drains, additional drainage capacity, key facilities above the highest recorded flooded level plus freeboard)
- Combination of structural and non-structural options (e.g., urban master plans, local building codes, engineering design standards, water safety planning, groundwater monitoring, disaster management standing committee, awareness raising)
- Climate down-scaling and use of hydrological models during project design if necessary (cost and time)



1944



1983



1995



Floods in Bangkok

Flood management measures in Bangkok

Flood management and drainage infrastructure improvement (conveyance, flood defense, embankment)

Natural buffers (e.g. wetlands)

Groundwater management/rainwater harvesting

Reducing social vulnerability: upgrading or provision of basic services to slums and low-income communities

Land use planning and zoning

Building codes

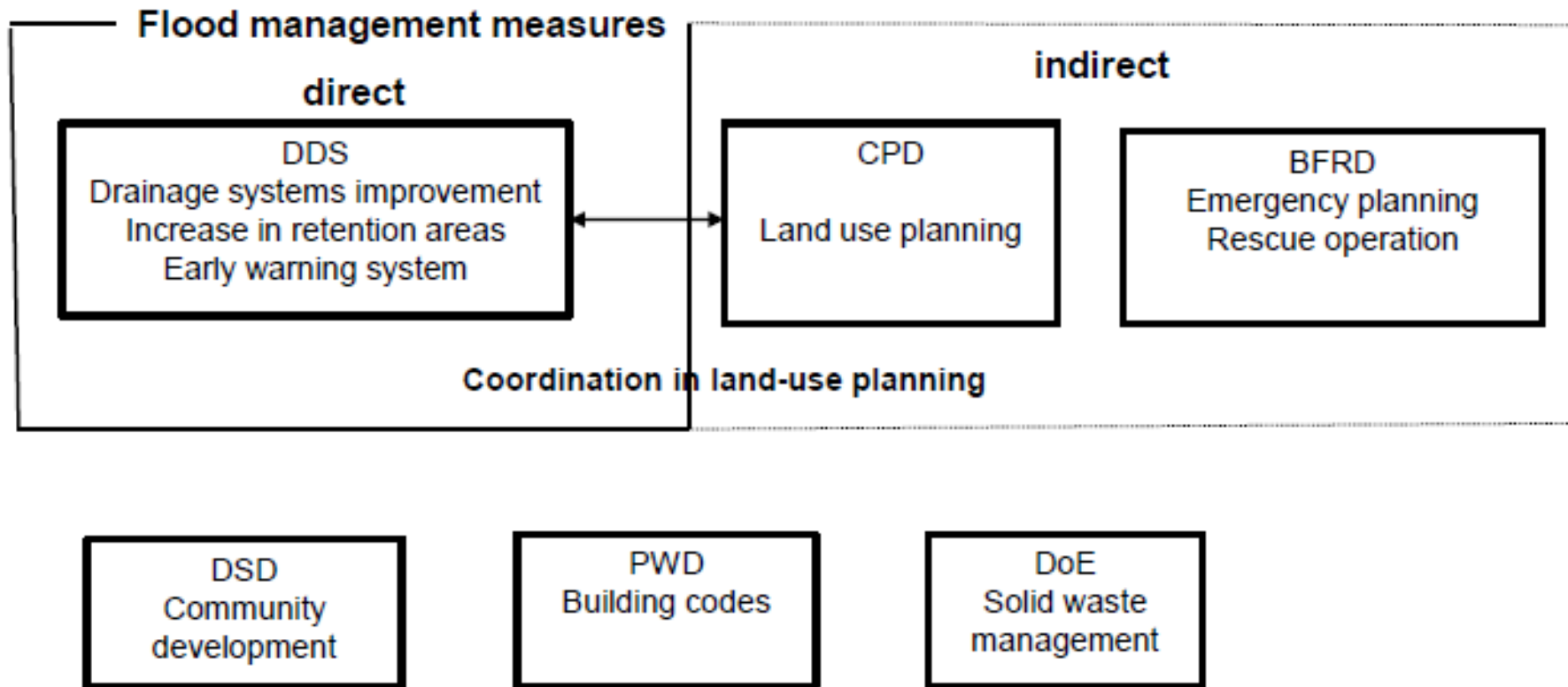
Early warning systems

Emergency planning and rescue

Awareness raising

- The above measures are “common” measures for flood management in cities, and all of them (except rainwater harvesting) are being practiced in Bangkok.
- However, these are implemented by different departments with little coordination, without consideration of climate change.

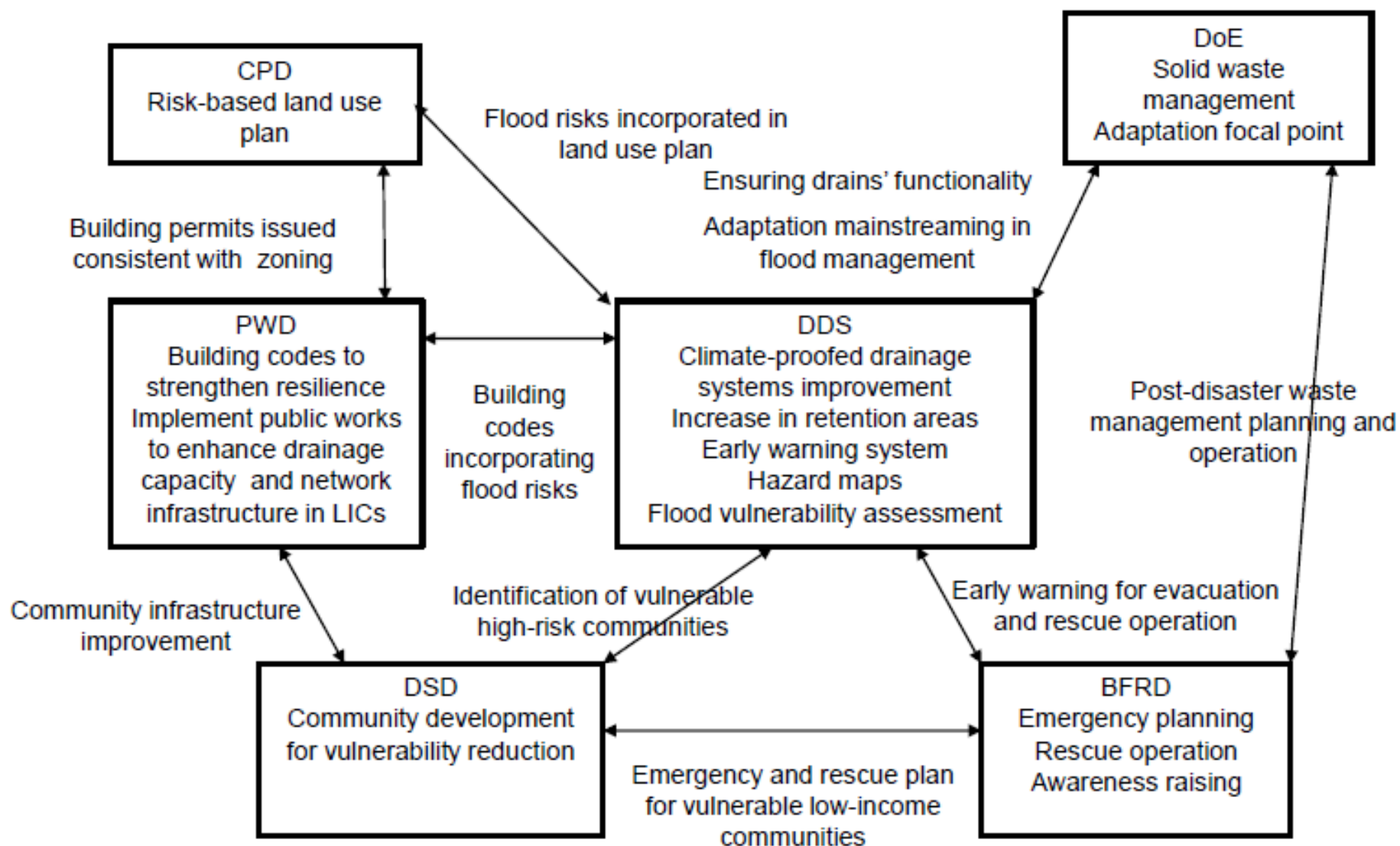
Current institutional arrangement



No involvement as flood management

CPD = City Planning Department, DDS = Department of Drainage and Sewerage, DoE = Department of Environment, DSD = Department of Social Development, BFRD = Bangkok Fire and Rescue Department, PWD = Public Works Department,

Appropriate institutional arrangement



Lessons and conclusions

- Climate adaptation needs to be addressed as a part of development process (i.e., mainstreaming).
- Climate change is one factor, but other factors (e.g., population increase, land use change) can be equally or more important.
- Urban planning (e.g., land use plans, building codes) is critical but remains a major challenge.
- Collaboration among various departments of local government and between local governments and central government agencies is essential.
- Key factors include (i) leadership, (ii) collaboration, (iii) good governance (participation, inclusiveness, accountability), and (iv) sound evidence base.
- Vulnerability/risk assessment would be the first step for urban adaptation planning.
- A robust approach (with flexibility, not focusing on optimal engineering design) is needed.