

# Climate Finance in the Water Sector



## Pilot Training on Climate Finance Tracking

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Michiel de Lijster

Senior Water Resources Specialist, SDSC-WAT

Water is one of the three most impactful risks over the next decade.  
– *World Economic Forum Global Risks Report 2016*



# PRESENTATION OUTLINE

1. Overview of the Water and its Subsectors
2. Water-Related Climate Impacts
3. Examples in ADB projects



# Water and its Subsectors

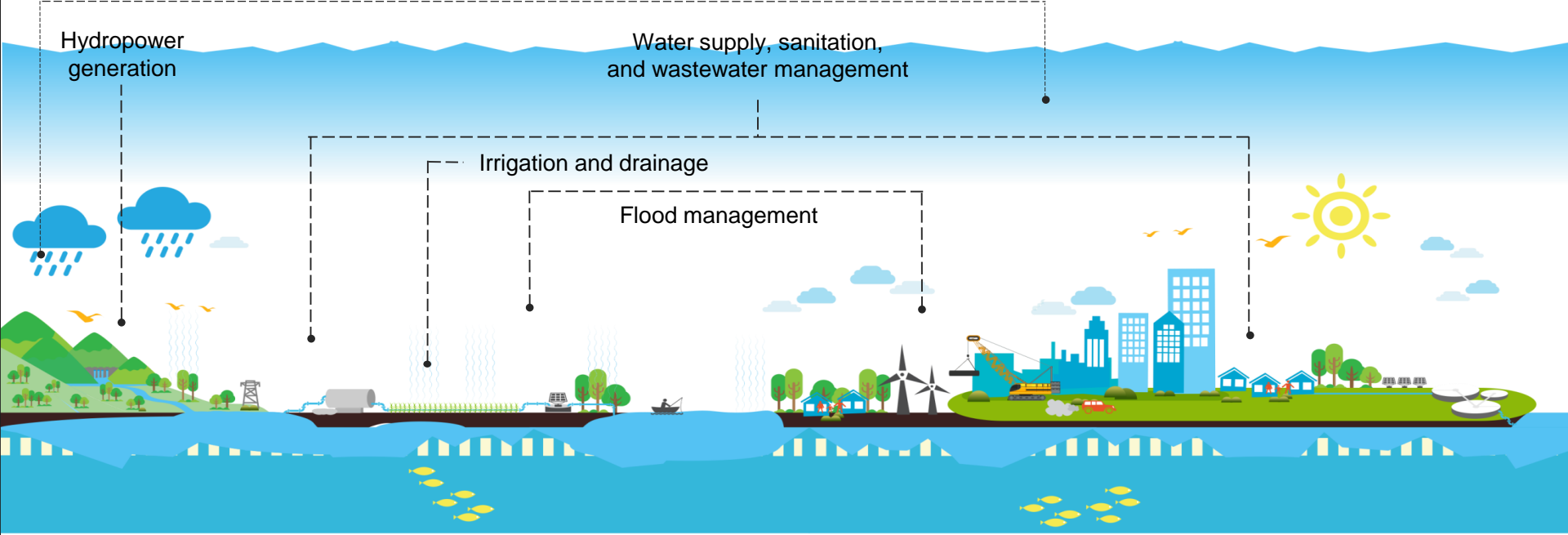
Water resources management (including wetlands and watershed protection)

Hydropower generation

Water supply, sanitation, and wastewater management

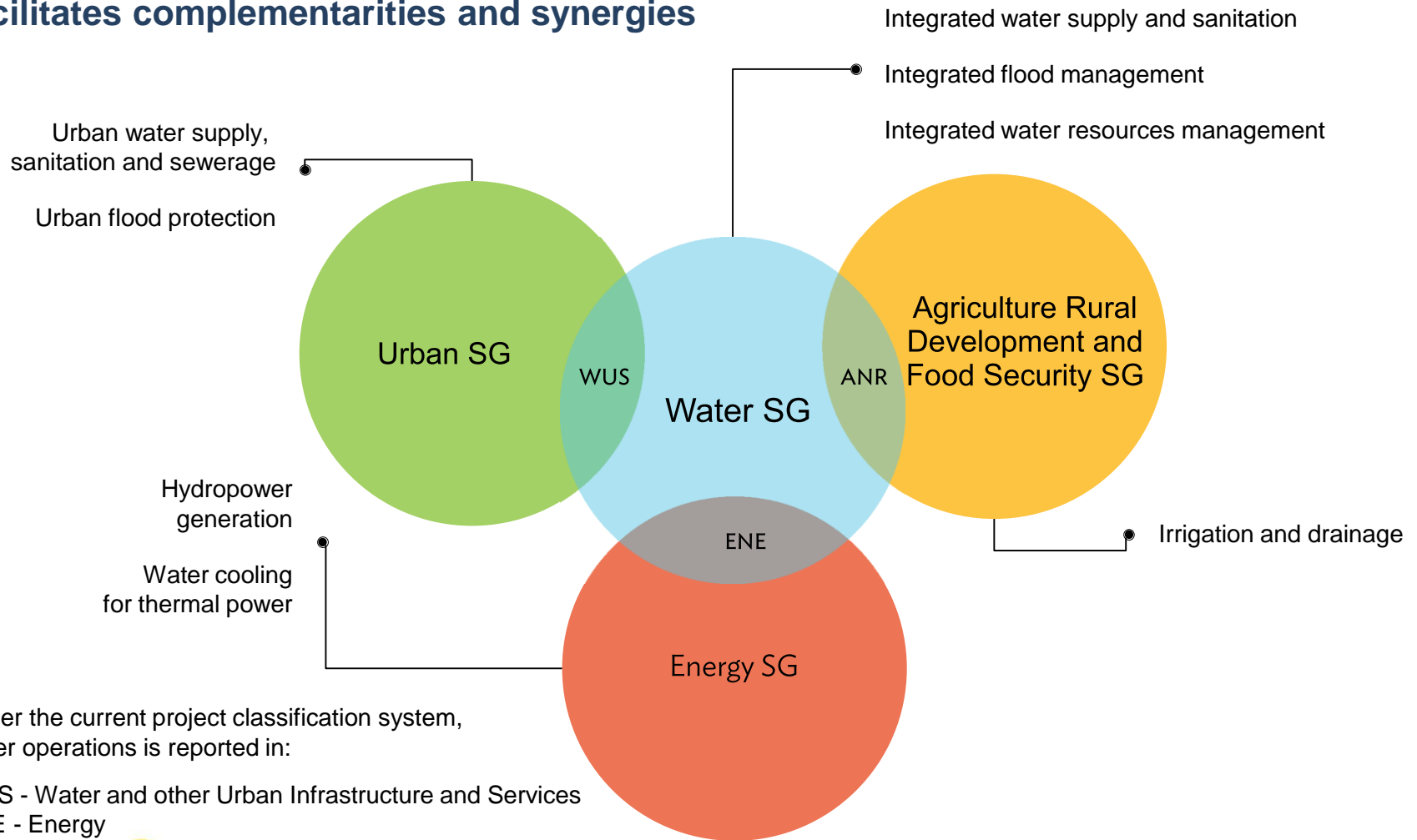
Irrigation and drainage

Flood management



# Water is cross cutting

Water SG covers overall water issues and facilitates complementarities and synergies



Under the current project classification system, water operations is reported in:

WUS - Water and other Urban Infrastructure and Services

ENE - Energy

ANR - Agriculture, Natural Resources, and Rural Development



# Mitigation – water related

- Wind or solar-driven pumping systems
- Reduce methane emissions in wastewater treatment
- Materials recovery and reuse with net emissions reductions

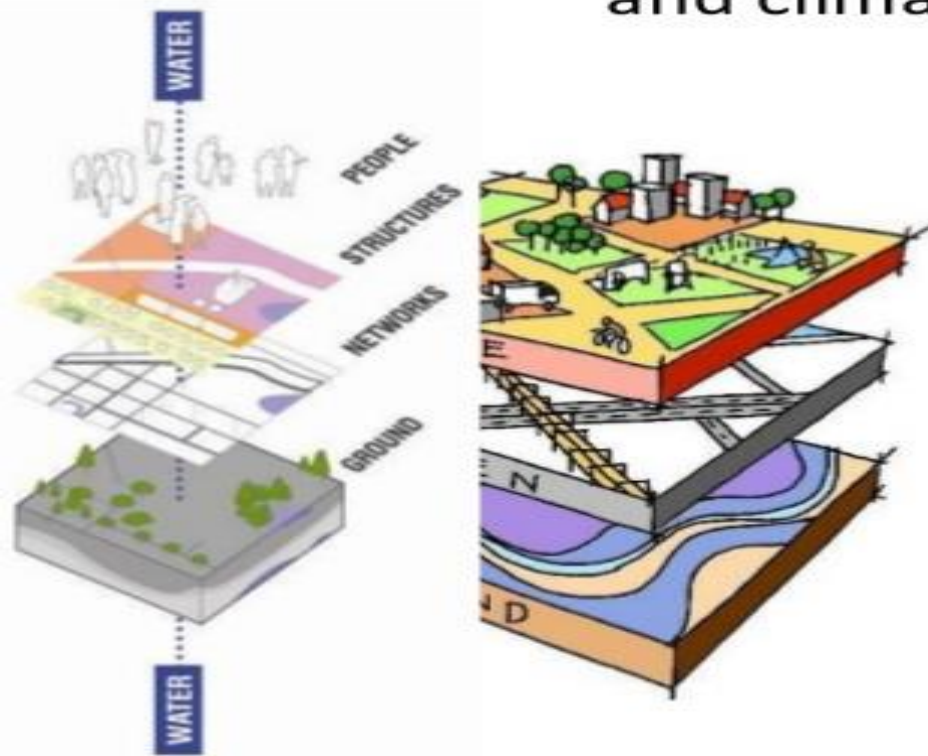


# Water-related Disasters & Climate Change Risks: Floods and Droughts



# Adaptation – basic approach

Multi-layer approach to flood risk prevention and climate adaptation





# Adaptation – manage climate risks

Potential Impacts	Potential Adaptation Response
Reduction in river water levels and flows due to lower and less frequent rainfall	Improved catchment management and regulation of water abstraction
Increased riverine flooding due to heavier and more frequent rainfall	Increased river dredging, develop emergency plans to cope with extreme events focused on evacuation and rescue
Increasing seasonal droughts and shorter rainy season	drip irrigation, laser land levelling
Increased exposure of infrastructure to coastal flooding and sea level rise	Protection of infrastructure from increased flooding; well fields relocated away from floodplains, raised well heads

# The MDB common methodology for tracking adaptation finance

in 3 steps:

1. Establishing Climate Vulnerability **Context**
2. Explicit Statement of **Purpose** / intent
3. Climate Risk and Project Activity **Linkages**



# 1. Establishing Climate Vulnerability Context

- Document why climate adaptation is necessary
- Provide robust evidence\*
- Complete Climate Checklist and run the Aware Tool
- Include results in the Concept Paper
- Identify adaptation activities and costs in RRP rationale, due diligence, and risks and mitigation measures sections
- Append Climate Risk and Vulnerability Assessment CRVA report



# Context

## PAK: Pehur High Level Canal Extension Project

“The overall design is geared toward climate resilience, and each project component’s design incorporates a number of adaptation measures, including some based on the ecosystem, to withstand projected increases in rainfall intensity and temperatures.

These include

- (i) increasing water systems’ flood retention and drainage capacity,
- (ii) enhancing the design of flood protection barriers, and
- (iii) selecting climate-resilient materials and equipment in the wastewater and solid waste management systems. Incremental costs associated with the above measures are estimated at \$10.8 million.”

Source: RRP, paragraph 26



# Context

## BAN: Coastal Towns Environmental Infrastructure Project

“Climate change is a critical development issue for Bangladesh. The country’s low-lying coastal zone ... is highly vulnerable to cyclones, storm surges, sea level rise, and salinity intrusion. A 1.5°C increase in temperature and 4% increase in precipitation ... would potentially result in sea levels in the Bay of Bengal rising by 27 centimeters or more by 2050.

Warmer temperatures would result in more frequent and intense cyclones and storm surges, damaging roads and bridges and rendering existing drainage, water supply, and sanitation systems ineffective, as well as threatening public health and safety....

The poor and women are disproportionately affected and have the lowest capacity to cope with losses. There is a high demand for climate-resilient infrastructure and disaster preparedness to improve the wellbeing of residents and reduce migration to larger cities.”

Source: RRP, paragraph 4.



# Context

## PRC: Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project

“Climate change poses some risk to this project. Projected temperature increases in Xinyu may stress physical structures, degrading materials (particularly plastic) and affect piping through subsidence due to fluctuating soil moisture levels.

Precipitation changes are highly uncertain, with both small increases and decreases in total precipitation annually projected. However, the increase in rainfall variability and increase in the intensity of extreme rainfall events will potentially increase flood risk.

Sudden intense storms following a drought may lead to flash flooding due to poor absorbent capacity of soils (hard pan). It should be noted, however, that a number of factors besides climate change influence flood risk, including increasing hardscape, conversion of wetlands, and inappropriate dumping of trash leading to clogged pipes.”

Source: SD 6 – Technical Notes on Climate Change, paragraph 43.



## 2. Explicit Statement of Purpose

- Managing climate risks is identified as specific objective or rationale in project documents
- Include context- and location-specific climate risks and vulnerabilities
- Include in TA report, RRP or PFR Report



# Purpose

## PAK: Pehur High Level Canal Extension Project

“The project was found to be at high risk on climate change impact. A climate risk and vulnerability was assessed based on the climate change risk simulation using the result of global circulation models. Adaptation measures were incorporated in the project design to reduce the risks resulting from increased flood events.”

Source: RRP, paragraph 28





# Purpose

## BAN: Coastal Towns Environmental Infrastructure Project

“The project is prioritized in the government’s Strategic Program for Climate Resilience (2010) under the Pilot Program for Climate Resilience, and will demonstrate new approaches for integrating climate resilience into urban development in coastal pourashavas.

The government’s Sixth Five-Year Plan, 2011–2015 targets assistance to vulnerable coastal populations requiring investments in climate-resilient infrastructure and urban planning.

The project is consistent with the Bangladesh country partnership strategy, which targets assistance to vulnerable coastal areas in adapting to the risks of climate change, and is consistent with the ADB Urban Operational Plan to promote climate-change-resilient cities.”

Source: RRP, paragraph 3.



# Purpose

## PRC: Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project

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Source: RRP, paragraph 26



# Purpose

## TAJ: Water Resources Management in Pyanj River Basin Project

“Output 2: Modernized and climate-proofed Chubek Irrigation System water resources management infrastructure fully operational. This includes

- (i) modernization and rehabilitation of I&D infrastructure and its climate proofing,
- (ii) construction of a sediment- excluding basin,
- (iii) modernization and rehabilitation of pumping units, and
- (iv) capacity development of ALRI staff.

Source: RRP, paragraph 15.



# 3. Climate Risk and Project Activity Linkages

- Articulate links clearly
- Brief description of the adaptive activities should be in the TA report, technical due diligence of the RRP, and the PFR report
- Details in the CRVA, Project Climate Risk Assessment and Management Report, PAM, etc.



# Linkages

## PRC: Qinghai Haidong Urban-Rural Eco Development Project

- *CRVA findings*: significant change in water volumes by 2030, increase in seasonal and annual variability in rainfall and river flow volumes, rising temperatures and shrinking glacier areas
- *Adaptation measures*: adjusting flood height for river rehabilitation component, enlarging storm water outlet size, adjusting runoff depth in solid waste disposal design



# Linkages

## TAJ: Water Resources Management in Pyanj River Basin Project

- *CRVA findings:* air temperatures will increase by 1.7 ° C from 2010-2050, mean annual evapotranspiration will increase in line with the temperature, annual mean river flow is likely to increase, magnitude and frequency of mudflows and floods likely to increase, annual water demand to increase by an additional 23.8 million cu.m. sedimentation to increase in Cubek Irrigation system
- *Adaptation measures:* introduce high efficiency irrigation systems, remodeling of 11% of the effected inter-farm canals to meet the climate-proofed discharge requirement, construction of a sediment excluding basin, non-infrastructure measures such as better coordination among watershed stakeholders



# Estimating Adaptation Finance – 2 types of projects

Type 1: Climate Proofing of Development Projects	Type 2: Project Activities predicated on CC Adaptation
Did not explicitly intend to address CC impacts	Directly predicated on addressing CC impacts
CRVA conducted during project development stage	CRVA conducted prior to selection of activity/output
Derive incremental cost of adaptation	Count 100% of activity or output costs
	Include DMF outcome and output indicators for adaptation



# Type 1

## TAJ: Water Resources Management in Pyanj River Basin Project

District	Total no. of Inter-farm Canals	Canals with Sufficient Capacity	Canals with Insufficient Capacity	Estimated Cost of Climate Proofing, \$
Hamadoni	27	19	8	288,900
Farkhor	35	34	1	48,150
Vose	3	1	2	48,150
Kulob	1	1	0	0
<b>TOTAL</b>	<b>66</b>	<b>55</b>	<b>11</b>	<b>385,200</b>





# Type 1

## PRC: Qinghai Haidong Urban-Rural Eco Development Project

During the PPTA, the incremental costs for the specific adaptation measures that were included in the project was calculated to be \$9.44 million. This covers the cost of:

- Adjusting additional 0.1m increase in design flood height for the river rehabilitation component;
- Adjusting additional 0.2m increase in design flood height for the river rehabilitation component;
- Enlarging the storm water outlet size by 8% based on design storm discharge; and
- Adjusting the runoff depth in solid waste disposal (landfill) design due to an expected increase in the 50-year return storm from 32mm to 34mm; and adjusting the 100-year storm from 39 mm to 42mm.



## Type 2

# VIE: Water Efficiency Improvement in Drought Affected Provinces

Accepted as predicated on climate variability and change, therefore, 100% of ADB lending can be counted as climate financing (\$120 million)

The project, which aims to improve water productivity in Viet Nam's agriculture sector, was requested by the Vietnamese government after the 2015 El Niño effect caused severe drought conditions. Rainfall in 2015 wet season was 32% less than an average year. About 60,000 has of agricultural land was subject to varying degrees of crop failure in 2015. Likely long-term climate scenario is increase of 0.8°C to 0.9°C annual mean air temp, with little change in rainfall.



# Type 1 & 2

## PRC: Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project

Activity	Est. Cost (\$M)
Infrastructure to increase flood retention capacity of rivers and lakes (levees, embankments, etc.)	3.97
Incremental cost of storm water network pipe thickness increase due to possible ground subsidence	0.95
Incremental cost of new material selection for sewage network and change in pump station design	0.98
Climate proofing components (non infrastructural)	4.90
Total incremental costs	10.80
Pro-rated finance charges	0.45
<b>TOTAL climate finance</b>	<b>11.25</b>



# Capturing Climate Finance in the Project DMF - indicators

Subsector	Sample Indicators
Irrigation	<ul style="list-style-type: none"><li>• All irrigation infrastructure includes climate resilient design features like additional freeboard</li><li>• Water productivity increased from xx m<sup>3</sup>/ha to xx m<sup>3</sup>/ha</li></ul>
Flood Management	<ul style="list-style-type: none"><li>• Storage capacity of xx m<sup>3</sup> reservoir is increased by xx m<sup>3</sup></li><li>• Flood embankments elevation increased from xxm to xxm</li><li>• Diameters of pipes increased by xx% to better cope with increased precipitation and extreme weather events</li></ul>
Drainage	<ul style="list-style-type: none"><li>• flood damages reduced by xx %/ \$ xx in coverage areas</li><li>• Drainage canals introduced over xx ha where previously there were no drainage facilities</li></ul>



# Capturing Climate Finance in the Project DMF - indicators

Subsector	Sample Indicators
Water Supply	<ul style="list-style-type: none"><li>• Diversity of water supply sources are utilized</li></ul>
Wastewater	<ul style="list-style-type: none"><li>• Increased effluent treatment to address increasing surface water temperatures of receiving water bodies implemented</li><li>• Pump stations raised and levees built to avoid rising sea levels from rendering the plants inoperable</li></ul>
Institutional Development	<ul style="list-style-type: none"><li>• XX number of farmers (of which xx % are women) are trained in land and water management response to increased climate variability</li><li>• Early warning system for flood risk management designed, installed and implemented.</li></ul>



## *Adaptation indicators*

# VIE: Urban Environment and Climate Change Adaptation Project

*Outcome:* People's access to climate change resilient urban infrastructure in Dong Hoi and Hoi An improved

### *Selected output indicators:*

- Hoi An: Damages by coastal flooding reduced by \$2.0 million per year (2009–2013 average: \$2.5 million) benefiting 15,600 urban households
- New urban area development plan is finalized incorporating climate change resilience consideration
- Measures to protect coastal dune complex from erosion are implemented

Source: Project Administration Manual

