



Assessing Investment & Financial flows for Adaptation in the **WATER** Sector

Characteristics of the water sector

- Since watersheds & rivers don't know borders, the water sector requires international cooperation
- Measures & activities planned in the water sector will have to be coordinated with neighboring countries

1. Establish key parameters of the assessment

- Define scope for the assessment
- Define the institutional framework
- Specify the time horizon for the analysis: 2015-2030 recommended, base year 2015 recommended
- Build on existing model for the sector where possible

1. Establish key parameters of assessment

Define boundaries for the assessment

Scoping the water sector

- Can include
 - ▣ Water supply
 - ▣ Demand (growth, management, sector)
 - ▣ Groundwater
 - ▣ Surface freshwater
 - ▣ Flood risk management
 - ▣ Glacial Lake Outburst Floods (GLOFs)

1. Establish key parameters of assessment

Define boundaries for the assessment

Supply side & demand side Water sector adaptation measures

Supply side	Demand side
Prospecting & extraction of groundwater	Improvement of water-use efficiency by recycling water
Increasing storage capacity by building reservoirs & dams	Reduction in water demand for irrigation by changing the cropping calendar, crop mix, irrigation method, & area planted
Desalination of sea water	Reduction in water demand for irrigation by importing agricultural products, i.e., virtual water
Expansion of rain water storage	Promotion of indigenous practices for sustainable water use
Removal of invasive non-native vegetation from riparian areas	Expanded use of water markets to reallocate water to highly valued uses
Water transfer	Expanded use of economic incentives, including metering & pricing to encourage water conservation

1. Establish key parameters of assessment

Define boundaries for the assessment

Possible adaptation measures in the water sector

Type of Measure	Adaptation Measure
Increase freshwater supply	Extraction of groundwater
	Increase surface water storage capacity
	Desalination of seawater
Improve quality of freshwater supply	Forest protection, afforestation, reforestation...
	Improve wastewater collection & treatment
	Improve solid waste management systems
Improve efficiency of water use	Improve irrigation efficiency
	Alter crop type mix
	Water conservation improvements
Reduce damages of droughts & floods	Improve seasonal weather forecasting
	Construction of dykes
	Improve flood hazard mapping

2. Compile historical I&FF data and other input data for scenarios

- Data collection, rely on national accounts data
- The **System of National Accounts** (SNA) constitutes the primary source of information about the economy
- **Systems of integrated environmental & economic accounts** (SEEA) were developed to address statistical gaps
- Other sources: **National water plans, National Communications** etc.

2. Compile historical I&FF data and other input data for scenarios

Data collection, rely on national accounts data

Examples of I&FF data disaggregation in each sub-sector

Category of Investment Entity	Source of I&FF Funds	Investment Flows (2005 \$)		Financial Flows (2005 \$)	
		Facility / Technology Type 1	Facility / Technology Type 2	Practice / Measure Type 1	Practice / Measure Type 2
Households	Domestic				
	Total Household Funds (all domestic)				
Corporations	Domestic (e.g. Business investments in hotels, restaurants)				
	Foreign (e.g. Int'l service industry- travel agencies, tourism info centers)				
	Total Corporation Funds				
Government	Domestic (e.g. Physical infrastructure- roads, communication)				
	Foreign				
	Total Government Funds				

Data sources complementing national sources

- AQUASTAT: Data & information on water resources & agricultural water management by country & region. Includes data on dams, irrigation system investment costs, & irrigated areas:

<http://www.fao.org/nr/water/aquastat/main/index.stm>

3. Define Baseline Scenario

- Define the physical basis for the Baseline Scenario
- **A baseline scenario:** Description of what is likely to occur in the absence of ADDITIONAL policies to address climate change; expected socioeconomic trends (e.g. per capita water consumption), technological change (if relevant), & expected business-as-usual investments in the sector

Baseline scenario reflects

- Current sectoral & national plans
- Expected socioeconomic trends
- Expected investments in the subsectors

Information should be disaggregated by

- Year (starting 10 years before the Base Year)
- Source (by corporations & government)
- Type (national funds, foreign direct investment, official development assistance)

4. Derive I&FF for baseline scenario

- Compile annual estimates, disaggregated by investment entity, source, investment flow type, & financial flow type
- Calculate the **total investment cost** in real, unannualized terms over the planning period.
- Estimate **annual investment costs** associated with the new plan
- Develop a **breakdown of total investments** into major categories (e.g., ODA, FDI, domestic funds)

4. Derive I&FF for baseline scenario

Estimate annual I&FF

Adding costs to baseline scenario

Funding entity category	Source of funds	Cumulative investment* (2015-2030)	
		(billion 2015 \$)	(%)
Households	Domestic funds		
Governments	Domestic funds (budgetary)		
	Foreign borrowing (loans)		
	Foreign aid (ODA)		
Corporations	Domestic equity		
	Foreign investment		
	Domestic debt		
	Foreign borrowing		
	Government support		
	Foreign aid (ODA)		
	Total		

*Irrigation channels (2015 \$/meter), water supply and sanitation systems (2015 \$/site)...

5. Define Adaptation scenario

- Adaptation scenario: a description of what is likely to occur in the sector, over the assessment period, in the presence of **additional** policies to address climate change
- The adaptation scenario should include previously identified adaptation options, such as those used in a national communication or in a national NAPA.

- Investment & Financial flows into **adaptation** may include 5 different types of measure
 - **Prevention:** measures taken to prevent the negative effects of climate change & climate variability on water resources management.
 - **Improving resilience:** measures aim to reduce the negative effects of climate change & climate variability on water resources management by improving adaptive capacity; targets long-term development
 - **Preparation:** measures that aim to reduce the negative effects of extreme events on water resources management
 - **Response:** reactive measures that aim at alleviating the direct negative effects in the aftermath of extreme events
 - **Recovery:** aim at restoring the societal & natural system after an extreme event has taken place

5. Define adaptation scenario

Example adaptation options

Prevention measures	<ul style="list-style-type: none">• Prevention of urban development in flood-prone areas• Development of water efficient methodologies in water-dependent sectors• Afforestation to improve the retention of water or prevent landslides
Resilience Measures	<ul style="list-style-type: none">• Changing agriculture to crops that are less water-demanding or salt-resistant.• Tactical level: operate dams in such a way that sufficient water is retained in the wet season to balance for the water needs in the dry season
Preparation measures	<ul style="list-style-type: none">• Establishment of early-warning systems, emergency planning• Awareness raising• Increasing storage• Demand management, technological development
Response measures	<ul style="list-style-type: none">• Establishment of safe drinking water & sanitation facilities
Recovery measures	Activities for the reconstruction of infrastructure

6. Derive I&FF for Adaptation Scenario

- Compile annual estimates, disaggregated by investment entity, source, investment flow type, & financial flow type
- Estimate annual investment costs associated with the alternative management plan
- Calculate the total investment cost in real, unannualized terms over the planning period
- Develop a breakdown of total investments into major categories (e.g., ODA, FDI, domestic funds)

6. Derive I&FF for adaptation scenario

Project I&FF associated with the Adaptation Scenario

Adding costs to adaptation scenario

	Cumulative infrastructure (2015-2030)	Unit cost
Facility/Technology		
Water resource protection	(# activities)	(2015 \$/activity)
Water supply network	(# meter of pipes)	(2015 \$/meter)
Sanitation – treatment plant	(# plants)	(2015 \$/plants)
River development	(# activities)	(2015 \$/activity)
<i>Total</i>		

Adding costs to adaptation scenario

		Cumulative investment (2015-2030)	
Funding entity category	Source of funds	(billion 2015 \$)	(%)
Households	Equity & debt		
Governments	Domestic funds (budgetary)		
	Foreign borrowing (loans)		
	Foreign aid (ODA)		
Corporations	Domestic equity		
	Foreign investment		
	Domestic debt		
	Foreign borrowing		
	Government support		
	Foreign aid (ODA)		
Total			

7. Estimate changes in annual I&FF needed to implement adaptation

- Subtract the baseline annual I&FF, by entity & source, from the annual adaptation I&FF, by entity & source
- Subtraction of the Baseline Scenario from the Adaptation Scenario
- Sum incremental amounts over all years, by entity & source

7. Estimate changes in annual I&FF needed to implement adaptation

Subtract the baseline annual I&FF from the adaptation annual I&FF

- For each chosen water adaptation option, the analysis should identify the incremental investment (total dollars) by source (domestic funds, ODA, FDI etc.) up through 2030 to support the respective water management option

7. Estimate changes in annual I&FF needed to implement adaptation

Summarizing incremental investments

		Investment (billion 2015 \$)		
		Cumulative (2015-2030)		Incremental
Funding entity category	Source of funds	Baseline scenario	Adaptation Scenario	
Households	Equity & debt	Baseline value	Adaptation value	Baseline minus Adaptation value
Governments	Domestic funds (budgetary)			
	Foreign borrowing (loans)	...	...	...
	Foreign aid (ODA)	...	...	...
Corporations	Domestic equity	...	..	...
	Foreign investment	...	...	...
	Domestic debt	...	...	...
	Foreign borrowing	...	...	...
	Government support	...	...	...
	Foreign aid (ODA)	...	...	...
	<i>Total</i>	Sum (Baseline)	Sum (Adaptation)	Sum (Baseline minus Adaptation)

8. Evaluate policy implications

- Determine policy instruments & measures to encourage changes in I&FF
- Identify the entities that are responsible for the significant incremental changes in I&FF
- Determine the predominant sources of their funds, particularly important to distinguish between public & private sources of finance

8. Evaluate policy implications

Assess policy options and summarize the projected I&FF for the key sector

- Public water sector policies are likely to be needed to induce the relevant entities to implement the proposed measures
- Among the international entities that are active in water cooperations are:
 - ▣ Asian Development Bank, World Bank, Inter-american development Bank, European Bank for Reconstruction & Development

9. Synthesize results and complete report

- For more information on synthesizing results, documentation & the completion of the report, please refer to the Reporting Guidelines

Q&A CLARIFICATIONS

