



Assessing Investment & Financial flows for Adaptation in the Coastal Zones Sector

Climate change impacts on the coastal zones sector

Biophysical effects:

- Increased flood-frequency
- Erosion
- Inundation
- Rising water tables
- Saltwater intrusion
- Biological effects

Sea-level rise: socio-economic effects:

- Loss of economic, ecological, cultural & subsistence values through loss of land, infrastructure & coastal habitats
- Increased flood risk to people, land & infrastructure
- Changes in water management, salinity & biological activity, loss of tourism, coastal habitats & effects on agriculture/aquaculture



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 coastal zones sector

- Can include
 - Tourism
 - Human settlements
 - Agriculture, fisheries
 - Water supply, water ways
 - Financial services
 - Human health

1. Establish key parameters of assessment

Define boundaries for the assessment

Examples of potential impact pathways

Climate factor	Direction of change	Bio-geophysical effects	Potential impacts
Wave climate	Temporal & spatial variability expected	Changed patterns of erosion & accretion; changed storm impacts	Sediment supply, wave & storm climate
Storm track, frequency, & intensity	Temporal & spatial variability expected	Changed occurrence of storm flooding & storm damage	Wave & storm climate, morphological changes, Sediment supply, flood management, morphological changes, land claim Catchment management & land use
Precipitation intensity / runoff	Intensified hydrological cycle, with wide regional variations	Changed fluvial sediment supply; changed flood risk in coastal lowlands, catchment management	CO2 fertilization, sediment supply Sediment supply, migration space, direct destruction

1. Establish key parameters of assessment

Define boundaries for the assessment

3 basic adaptation strategies in the coastal zones sector:

- ❑ Protect: to reduce the risk of an event by decreasing the probability of its occurrence
- ❑ Accommodate: to increase society's ability to cope with the effects of the event
- ❑ Retreat: to reduce the risk of the event by limiting its potential effects



1. Establish key parameters of assessment

Define boundaries for the assessment

Example list of subsectors for screening & prioritization

Subsectors	Data availability	Investment (baseline & prior 10 years)	Priority in adaptation scenario			
			High	Medium	Low	Rank
Protect: to reduce the risk of an event by decreasing the probability of its occurrence						
Accommodate: to increase society's ability to cope with the effects of the event						
Retreat: to reduce the risk of the event by limiting its potential effects						

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 coastal zones plans, National Communications** etc.

- GLOSS – Global Sea-Level Observing System (http://www.gosic.org/goos/gloss_data_access.html)
- Permanent Service for Mean Sea Level (<http://www.nbi.ac.uk/psmsl/index.html>)
- National Aeronautics & Space Administration (NASA) (<http://edcdaac.usgs.gov/main.asp>)
- GTOPO30 global digital elevation model (<http://edcdaac.usgs.gov/gtopo30/gtopo30.asp>)
- Shuttle Radar Topography Mission (<http://www2.jpl.nasa.gov/srtm>)
- National Oceanographic Data Centre (<http://www.nodc.noaa.gov>)
- SURVAS (Synthesis & Upscaling of Sea Level Rise Vulnerability Assessment Studies, <http://www.survas.mdx.ac.uk/content.html>)
- DIVA (<http://www.dinas-coast.net>)

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

Data collection, rely on national accounts data

Examples of investment types (for the year 2013)

List of Investment types	IF (2013 US\$)	FF (2013 US\$)
Policies & measures	X	X
Regulations		X
Infrastructure	X	X
Training		X
Insurance		X
Research		X

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				

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, 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		

*Storm walls (2015 \$/meter), hotels (2015 \$/site), beach nourishment (2015 \$/kg), coastline monitoring services (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

Possible adaptation measures in the coastal zones sector

Category of adaptation measure	Measure
Land conservation	Reclaiming land in front of the coast to allow new freshwater lenses to develop
Water	Extracting saline groundwater to reduce inflow & seepage
Estuary	Empoldering estuary closure
Infrastructure	Constructing flood proof buildings
Freshwater supply	Infiltrating fresh surface water
Wetland	Restoring wetlands, inundating low-lying areas

6. Derive I&FF for Adaptation Scenario

- ❑ Estimate annual investment costs associated with the integrated coastal zones management plan
- ❑ 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
- ❑ Develop a breakdown of total investments into major categories (e.g., ODA, FDI, domestic funds)

Adding costs to adaptation scenario

	Cumulative installations (2006-2030)	Unit cost
Facility/Technology		
Storm walls	(# meters installed)	(2015 \$/meter)
Hotels	(# buildings)	(2015 \$/site)
Beach nourishment	(# kg sand)	(2015 \$/kg)
Coastline monitoring services	(# extension sites)	(2015 \$/site)
Early warning system	(# modules)	(2015 \$/module)
<i>Total</i>		

Adding costs to adaptation scenario

Funding entity category	Source of funds	Cumulative investment (2015-2030)	
		(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 coastal zones 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 coastal zones 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

- Identify entities responsible for significant incremental changes in I&FF
- Determine predominant sources of their funds, particularly important to distinguish between public & private sources of finance
- Determine policy instruments & measures to encourage changes in I&FF
- Coastal zones policies are needed to induce the relevant entities to implement the proposed measures

8. Evaluate policy implications

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

- Coastal zones sector policies are likely to be needed to induce the relevant entities to implement the proposed measures
- Adaptation can occur quickly in some sectors, but is slower in sectors with long-lived infrastructure
- These characteristics suggest a mix of adaptation policies

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

