



# Assessing Investment & Financial flows to address climate change in the **AGRICULTURE** Sector

# Relevance of the agriculture sector

- Agricultural production is heavily dependent on climate & water resources, and consequently is quite sensitive to changes in climate
- Moreover, most rural populations in developing countries rely primarily upon agriculture for their livelihoods
- FAO: Dependence of national agriculture on rain, strategy: more crop per drop

# 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
- Estimate contribution of agriculture to overall GDP

## **Scoping the agriculture sector**

- Can include
  - ▣ Production or processing of agricultural products
  - ▣ Food crops, floral crops, nursery plants, biofuel crops  
non-food crops ...
  - ▣ Livestock: Certain species, certain diseases, livestock  
fodder ...
  - ▣ Dairy production or processing

# 1. Establish key parameters of assessment

## Define boundaries for the assessment

Divisions	Groups	Classes
Crop & animal production, hunting & related service activities	Growing of non-perennial crops	Cereals, leguminous crops & oil seeds, vegetables, roots, tubers, ...
	Growing of perennial crops	Tropical & subtropical fruits, pome fruits & stone fruits, other tree & bush fruits & nuts, ...
	Plant propagation	Plant propagation
	Animal production	Cattle & buffaloes, horses & other equines, camels & camelids, sheep & goats, swine & pigs, ...
	Mixed farming	Mixed farming (crops & animals)
	Support activities to agriculture & post-harvest crop activities	Support activities for crop production, animal production, ...
	Hunting, trapping & related service activities	Hunting, trapping & related service activities

## 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 agricultural plans, National Communications** etc.

## Data sources complementing national sources

- FAOSTAT: Contains data on crop & animal production, trade, & consumption; agricultural prices; agricultural resources; & food security:

<http://faostat.fao.org/site/291/default.aspx>

- 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>

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

Examples of I&FF data in the agriculture sector

Type of flow	Type of physical asset
Investment flows	Agricultural & livestock development
	Agricultural land resources & water resources, pastures
	Agricultural inputs
	Food crop & cash crop production
	Livestock
	Agricultural alternative development
Financial flows	Agricultural extension & reform, grassland management
	Policy & planning
	Education/training
	Agricultural & livestock research & services
	Plant/post-harvest protection & pest control
	Agricultural & livestock financial services
	Agricultural co-operatives
	Livestock/veterinary services



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 (e.g., population growth & eating habits), 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 data, 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

Define 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)		
	<b>Total</b>		

\* Drought-resistant seeds (2015 \$/unit), machinery (2015 \$/piece), fertilizers(2015 \$/kg), irrigation channels (2015 \$/meter), ...

## 5. Define Target scenario

- Target 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 target scenario should include previously identified adaptation/mitigation options, such as those used in a national communication or in a national NAPA.

## 5. Define target scenario

# Adaptation/mitigation options in agriculture sector

Type of Measure	Component of Agriculture Sector	Adaptation/Mitigation Measure
Field-level	Crop Production (including production of human food crops, fodder, industrial crops, & biofuels)	Change crop species/varieties
		Moisture management/irrigation
		Pest & disease management
		Fire management
	Livestock (including both animal management & grazing land management)	Change animal species/breeds
		Change in animal management
		Change in pasture management
		Moisture management/irrigation
		Management of natural areas
	Research, education, assistance, infrastructure, institutional	Sector-wide
Forecasting & disaster management		
Trade policy		

## 6. Derive I&FF for Target Scenario

- Compile annual data, disaggregated by investment entity, source, investment flow type, & financial flow type
- Define 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 target scenario

# Project I&FF associated with the Target Scenario

## Adding costs to target scenario

	Cumulative infrastructure (2015-2030)	Unit cost
Facility/Technology		
Drought-resistant seeds	(# units purchased)	(2015 \$/unit)
Machinery	(# tractors etc.)	(2015 \$/piece)
Fertilizer	(# kg purchased)	(2015 \$/kf)
Irrigation channels	(# meters installed)	(2015 \$/meter)
<i>Total</i>		

## Adding costs to target 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)		
	<b>Total</b>		

## 7. Calculate changes in annual I&FF needed to implement adaptation/mitigation

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

## 7. Calculate changes in annual I&FF needed

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

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

## 7. Calculate changes in annual I&FF needed

## Summarizing incremental investments

		Investment (billion 2015 \$)		
		Cumulative (2015-2030)		Incremental
Funding entity category	Source of funds	Baseline scenario	Target Scenario	
Households	Equity & debt	Baseline value	Target scenario value	Baseline minus Target scenario 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 (Target)	Sum (Baseline minus Target)

## 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 agriculture 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/mitigation 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

