

# System of Environmental Economic Accounting



System of  
Environmental  
Economic  
Accounting



# WELCOME TO THE WORKSHOP ON THE SEEA CENTRAL FRAMEWORK

Thimphu, Bhutan



United Nations

## Small ice breaker-question 1

On a scale of 1 to 10, how familiar are you with the SEEA?

- 1—Starting to learn about it
- 5—Familiar with some of SEEA methodology and approach
- 10—Familiar with it and ready to start implementing

## Small ice breaker-question 2

Yesterday we had the lunch of the national plan for SEEA implementation. Which account are you most interested to compile

- Energy
- Timber/Forest
- Land
- Water
- Air emissions
- Other

## Small ice breaker-question 3

The organization that I work in is mostly/would be mostly

- A producer of data for SEEA accounts
- A user of data for SEEA accounts
- A coordinator/data steward for SEEA accounts

## Small ice breaker-question 4

Complete the following statement:

IN MY FREE TIME, I \_\_\_\_\_

- Like to watch movies
- Listen to music/Go to karaoke
- Play sports
- Spend time with friends and family
- Go on social media
- Do something not listed here!!
- Don't have any free time!!!



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# OVERVIEW OF THE SEEA AND ITS APPLICATIONS

Sokol Vako

United Nations Statistics Institute for Asia and the Pacific

Thimphu, Bhutan

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United Nations

# Content

- Why environmental-economic accounting? (Recap of yesterday)
- Defining the economy
- The accounting structure
- Applications of the SEEA



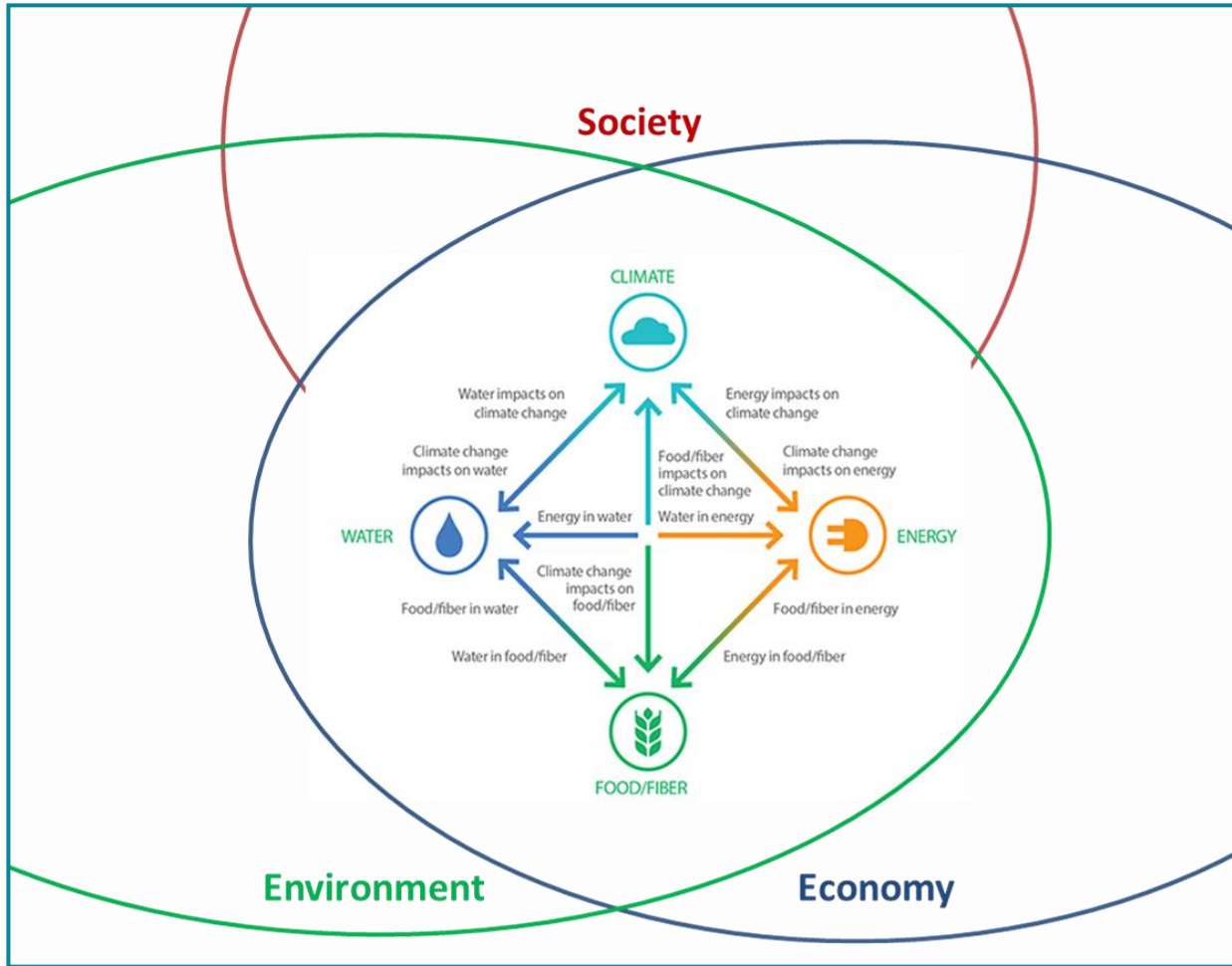
# WHY ENVIRONMENTAL- ECONOMIC ACCOUNTING?

# Good measurement for good management



- Sustainable management of the environment contributes to social and economic development
- **Accounting** for the environment means nature can be **managed** as a valuable asset and **reflected in policy**

# Integration for sustainable development



Integrated  
Policy

↑

Integrated  
Information

# Statistics for sustainable development

## Sustainable Development Policy

Evidence Based

Integrated

## Integrated Information System

Applies a uniform standard approach

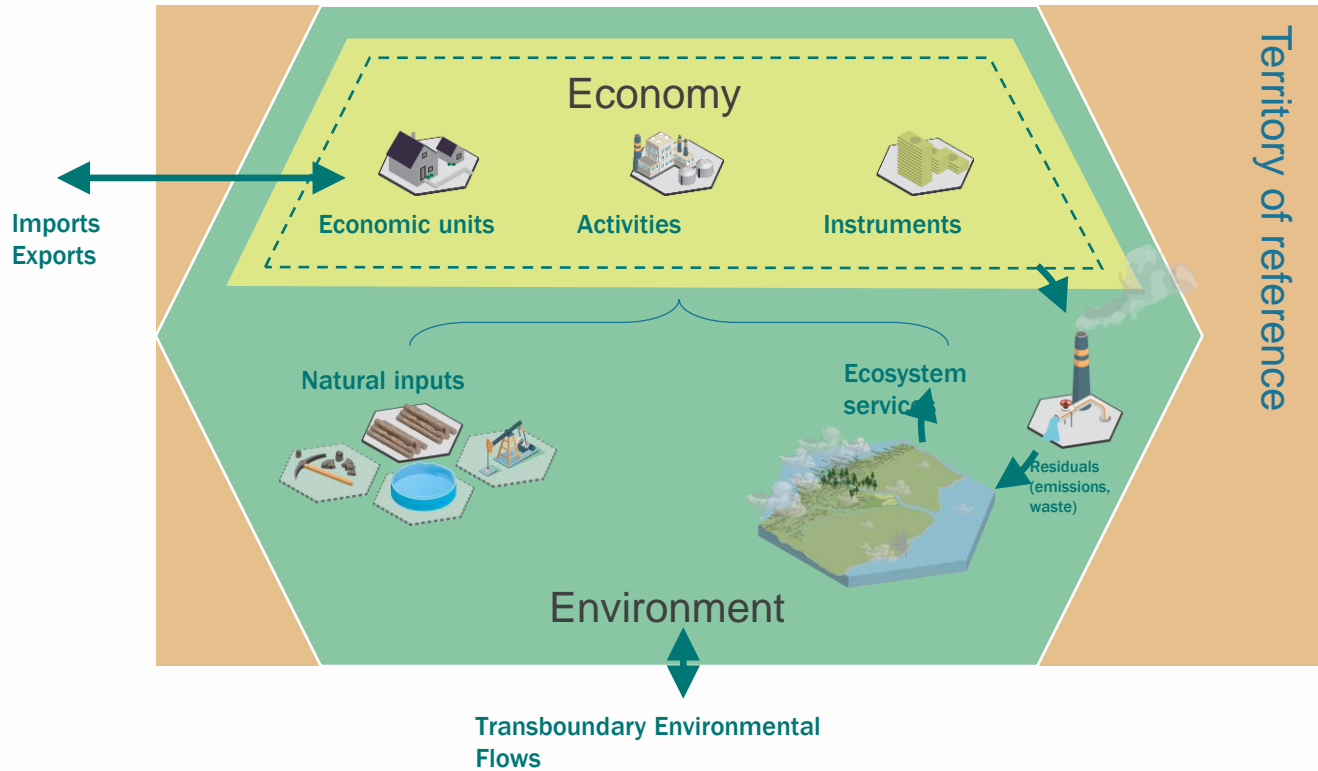
Integrates environmental, economic and social information

Captures synergies and trade-offs

# Silo approach → Integrated statistics



# SEEA Conceptual Framework



# A small detour: Defining the economy

# Defining the “Economy”

- Economic activities
  - > Production, Consumption, Accumulation
- Economic products
  - > Goods and services
- Economic assets
  - > Produced, Non-produced, Financial assets
- Economic units
  - > Establishments, enterprises, households, governments
- Economic territory
  - > Residence, geographic coverage



# Constituents of an economy

- All institutional units residing in the economic territory of a country during the accounting period constitute its economy.
  - > ***Institutional unit***: an entity capable of owning assets, incurring liabilities, carrying out economic activities taking decisions on all aspects of economic life and engaging in transactions with other entities
  - > ***Residing***: The economic territory in which an institutional unit has its centre of predominant economic interest [2008 SNA] is the residence of the unit.
  - > ***Economic Territory***: The geographic territory administered by the government of the country within which persons, goods, and capital can circulate freely.

# Enterprises, Establishments and Industries

- Enterprises
  - > Institutional units from the perspective of being producers of goods and services
- Establishments
  - > Enterprises in a single location performing a single or predominant type of productive activity
- Industries
  - > Groupings of establishments undertaking similar types of productive activity

# The Production Boundary

- “Production is an activity carried out ... by an institutional unit that uses inputs of labour, capital and goods and services to produce outputs of goods and services” (2008 SNA, 6.24)
- In practice:
  - > Exclude things you do only for yourself
  - > Exclude household production of services for itself
    - Except rent of owner-occupiers & wages of domestic staff
  - > Include household production of goods for itself
    - Agricultural products, fishing, fuelwood, clothes, furniture, water, energy
  - > Include concealed and illegal activity

# Types of Output and Production

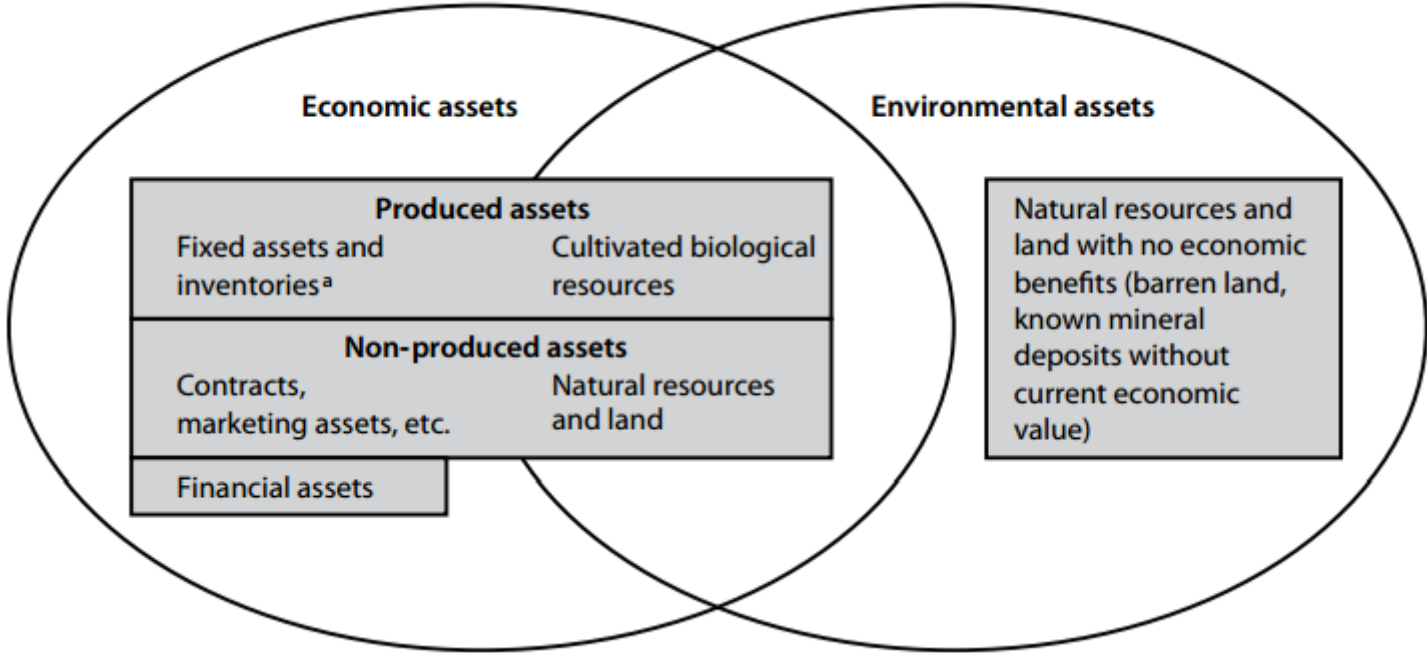
- Market output
  - > Transactions between economic units at market prices
- Non-market output
  - > Not transacted at market prices (government education, health)
  - > Valued at cost of production
- Own-account production (within establishments)
  - > For own final consumption (e.g. subsistence agriculture) : INCLUDED
  - > For own final capital formation (e.g. building own house) : INCLUDED
  - > For own intermediate consumption : EXCLUDED (except ancillary activity)

# Key Messages

- Many aspects to defining the economy
- Measurement boundaries are important to understand
  - > Production boundary key determinant of the size of GDP
- Own- account activity needs special consideration
- Economic (institutional) units can be seen from two key perspectives
  - > Institutional sector: Similar economic behaviours / legal basis
  - > Industry: Similar productive activities

# The accounting structure of the SEEA

# Environmental and economic assets



# Physical and Monetary Scope

- In principle, when accounting for environmental assets in physical terms all environmental assets whether or not they have a monetary value are included
  - > All land in a country is included in physical land accounts
  - > Also timber resources, other biological resources, soil, inland water resources
- Mineral and energy resources scope is known deposits



# Key Points and Boundary Issues

- Distinct treatment of land
  - > Account for its provision of space / area not the resources that are within it
- Include natural and cultivated biological resources
- Oceans and atmosphere excluded
- Stocks of potential energy from renewable sources excluded
  - > E.g. solar, wind, tidal power
  - > Slight exception for hydropower

# SEEA Central Framework

**1. Stock accounts** for environmental assets: natural resources and land

- physical (e.g. fish stocks and changes in stocks) and/or monetary values (e.g. value of natural capital, depletion)

**2. Flow accounts:** supply and use tables for products, natural inputs and residuals (e.g. waste, wastewater) generated by economic activities.

- physical (e.g. m<sup>3</sup> of water) and/or monetary values (e.g. permits to access water, cost of wastewater treatment, etc.)

**3. Activity / purpose accounts** that explicitly identify environmental transactions already existing in the SNA.

- e.g. Environmental Protection Expenditure (EPE) accounts, environmental taxes and subsidies

**4. Combined physical and monetary accounts** that bring together physical and monetary information for derivation indicators, including depletion adjusted aggregates

SEEA-CF (Central Framework)	<ul style="list-style-type: none"> <li>• <b>Assets</b></li> <li>• <b>Physical flows</b></li> <li>• <b>Monetary flows</b></li> </ul>	<ul style="list-style-type: none"> <li>• Minerals &amp; Energy, Land, Timber, Soil, Water, Aquatic, Other Biological</li> <li>• Materials, Energy, Water, Emissions, Effluents, Wastes</li> <li>• Protection expenditures, taxes &amp; subsidies</li> </ul>
SEEA Water; SEEA Energy; SEEA Agriculture, Forestry and Fisheries	Add sector detail	As above for <ul style="list-style-type: none"> <li>• Water</li> <li>• Energy</li> <li>• Agricultural, Forestry and Fisheries</li> </ul>

# Basic form of monetary supply and use table

	Industries	Households	Government	Accumulation	Rest of the world	Total
<b>Supply table</b>						
Products	Output				Imports	Total supply
<b>Use table</b>						
Products	Intermediate consumption	Household final consumption expenditure	Government final consumption expenditure	Gross capital formation (including changes in inventories)	Exports	Total use
	Value added					

# Basic form of physical supply and use table

	Industries	Households	Accumulation	Rest of the world	Environment	Total
<b>Supply table</b>						
Natural inputs					Flows from the environment	Total supply of natural inputs
Products	Output			Imports		Total supply of products
Residuals	Residuals generated by industry	Residuals generated by final household consumption	Residuals from scrapping and demolition of produced assets			Total supply of residuals
<b>Use table</b>						
Natural inputs	Extraction of natural inputs					Total use of natural inputs
Products	Intermediate consumption	Household final consumption	Gross capital formation	Exports		Total use of products
Residuals	Collection and treatment of waste and other residuals	Accumulation of waste in controlled landfill sites		Residual flows direct to environment		Total use of residuals

# Some observations on the physical and monetary supply and use tables

1. Differences in the rows
2. Differences in the columns
3. Classifications

# Supply and use identity

*Total Supply of Products*

= Output + ????

is identical to

*Total Use of Productions*

= Intermediate consumption

+ Household final consumption

+ Gross capital formation

+ ????

# Supply and use identity

*Total Supply of Products*

= Output + Imports

is identical to

*Total Use of Productions*

= Intermediate consumption

+ Household final consumption

+ Gross capital formation

+ Exports

# Input-output identity

*Materials into the economy* = Flows from the environment + imports + residuals received from the rest of the world + residuals recovered from the environment

*is equal to*

*Materials out of the economy* = Residual flows to the environment + exports + residuals sent to the rest of the world

*plus*

*Net additions to stock in the economy* = Gross capital formation + accumulation in controlled landfill sites - residuals from produced assets and controlled landfill sites



# Basic form of asset accounts

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## Opening stock of environmental assets

### Additions to stock

Growth in stock

Discoveries of new stock

Upward reappraisals

Reclassifications

*Total additions of stock*

### Reductions of stock

Extractions

Normal loss of stock

Catastrophic losses

Downward reappraisals

Reclassifications

*Total reductions in stock*

### Revaluation of the stock<sup>a</sup>

## Closing stock of environmental assets

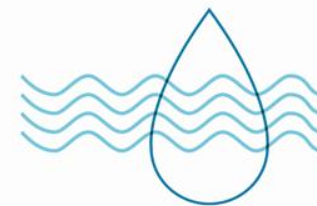
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# APPLICATIONS OF ENVIRONMENTAL- ECONOMIC ACCOUNTING

# Policy application – Lets start with an example

- **Increasing competition for scarce water resources:**
  - > Growing mineral sector → **Increased water demand**
- **Need for a diversified economy:**
  - > Ensure energy security → Coal mining → Increased water demand
  - > Support other sectors (agriculture, services, manufacturing) → **Manage rising water costs**
- **Need for social and environmental protection:**
  - > Maintain reliable and affordable domestic supply → **Manage competing uses** (from mines - esp. rural)
  - > Ensure sustainability of use → **Avoid over-abstraction** of groundwater (from mines)

# Water accounts – Information



## Physical Supply and Use Table

- Combined water use and national accounts data:

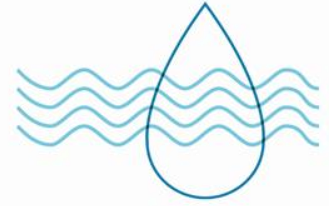
	Mineral Mining	Coal Mining	Agriculture	Manufacturing	Services
Water Use	HIGH	HIGH	VERY HIGH	LOW	LOW
Value Added	HIGH	LOW	LOW	HIGH	HIGH
Formal Employment	LOW	LOW	LOW	HIGH	HIGH
<b>Important Considerations</b>	<b>High Growth</b>	<b>Energy Security</b>	<b>Food Security</b>	<b>Employment &amp; protection from price volatility</b>	

- Illustrated supply-side issues - **losses**
- Illustrated potential of **wastewater re-use** and **alternate sources**

## Physical Asset Account

- Enabled monitoring of reservoirs and illustrated **spatial concerns**

# Water accounts – Policy response



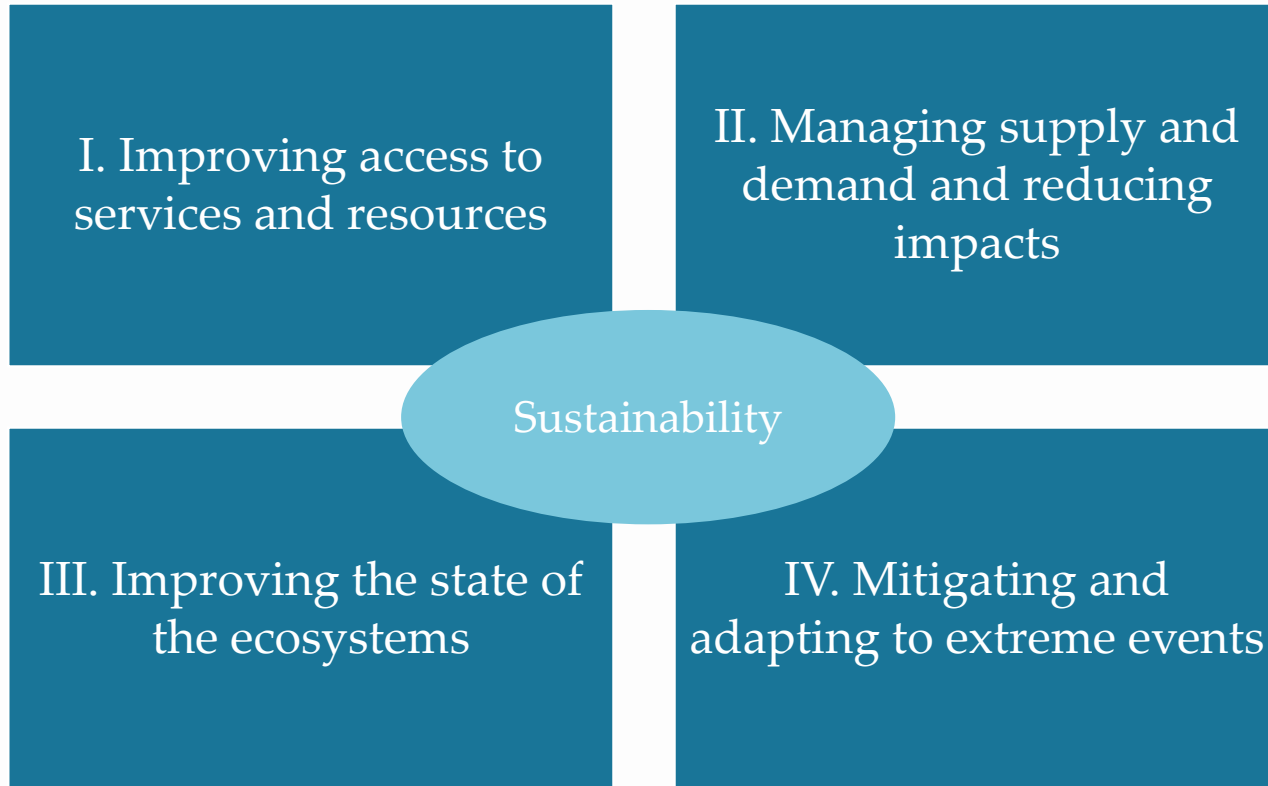
1. Invest in water supply system to reduce losses
2. Increase wastewater re-use and recycling, particularly in mining and agriculture
3. Use alternate sources of untreated freshwater and sea water (to protect supply of potable water to households and services)
4. Address cost discrepancies in supply of water to different sectors
5. Address over-extraction of groundwater by large mines

# Integrated environmental and socio-economic data for policy

Information from the SEEA can be used to:

- Analyze the impact of economic policies on the environment and vice versa
- Identify socio-economic drivers, pressures, impacts and responses affecting the environment
- Provide a quantitative basis for policy design, including;
  - > Productivity analysis
  - > Natural resource management
- Support greater precision for environmental regulations and resource management strategies
- Develop indicators that express the environment-economy relationship

# Policy quadrants and the SEEA



# SEEA and the SDGs

- SEEA accounts provide information relevant for 40 SDGs in 9 different goals
- The implementation of the SEEA itself is an SDG indicator





# Another example from Canada: Environmental Assessment of trade agreements

Purpose: Identify potential positive and negative impacts on the environment resulting from a proposed trade agreement.

Four-step methodology:

1. Identification of the economic effects of the negotiation (input-output based multiregional Computational General Equilibrium model). 5 different types of effects are considered: scale effects, structural effects, product effects, technology effects and regulatory effects; Physical flow accounts are linked with the different economic effects to estimate environmental impacts.
2. Identification of the likely environmental impacts of such changes (via link to SEEA Physical Flow Accounts)
3. Assessment of the significance of the likely environmental impacts
4. Identification of enhancement/mitigation options to inform the negotiations

# Another example from Canada: Environmental Assessment of trade agreements

Summary of Environmental Impacts of the Canada-EU Comprehensive Economic and Trade Agreement (CETA)						
	Scale Effect	Composition Effect	Total CETA-Induced Effect		Technique Effect	Total Effect, 2014
<b>GHG Emissions (kilotonnes of CO<sub>2</sub> eq)</b>	3,681	-1,375	2,306	<b>0.38%</b>	-393	<b>1,913</b>
<b>Energy Use (terajoules)</b>	51,820	-20,835	30,985	<b>0.36%</b>	-677	<b>30,308</b>
<b>Water Use ('000 m<sup>3</sup>)</b>	212,401	174,817	387,218	<b>1.10%</b>	N/A	<b>387,218</b>

The conclusion was that the quantitative analysis showed that the net impact of increased bilateral trade with the EU on Canada's environment would be minor based on projected changes in GHG emissions, energy use and water use.

<http://www.international.gc.ca/trade-agreements-accords-commerciaux/agr-acc/eu-ue/initialea-ceta-aecg-eeinitiale.aspx?lang=eng>

**THANK YOU**

[seea@un.org](mailto:seea@un.org)