Introduction to the SEEA & Policy Applications

Project: Advancing the SEEA Experimental Ecosystem Accounting

United Nations   UNEP   Convention on Biological Diversity   NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

1. **Policy Setting**

2. **An Integrated Information System for Sustainable Development**

3. **Adoption and Mainstreaming of Statistical Standard**

4. **Applications**

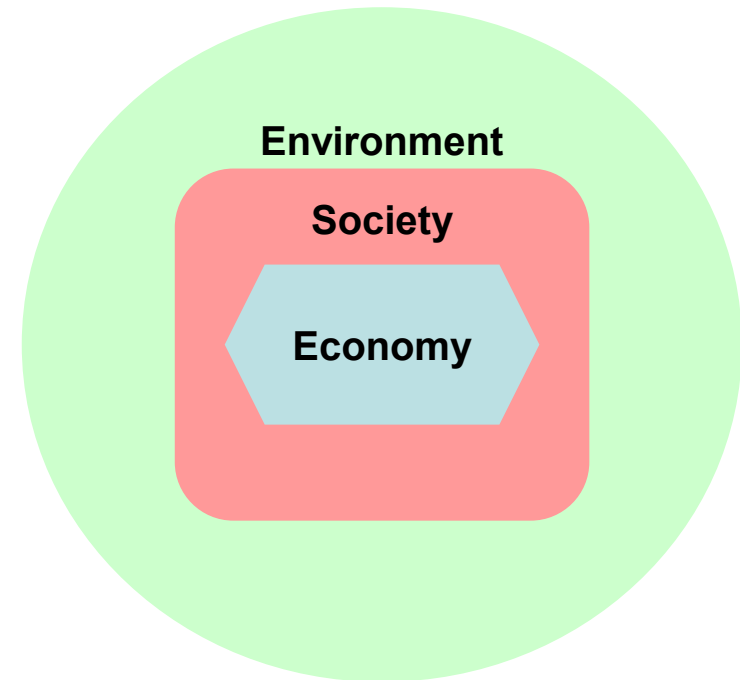# Policy Setting

Integrated and Sustainable Development
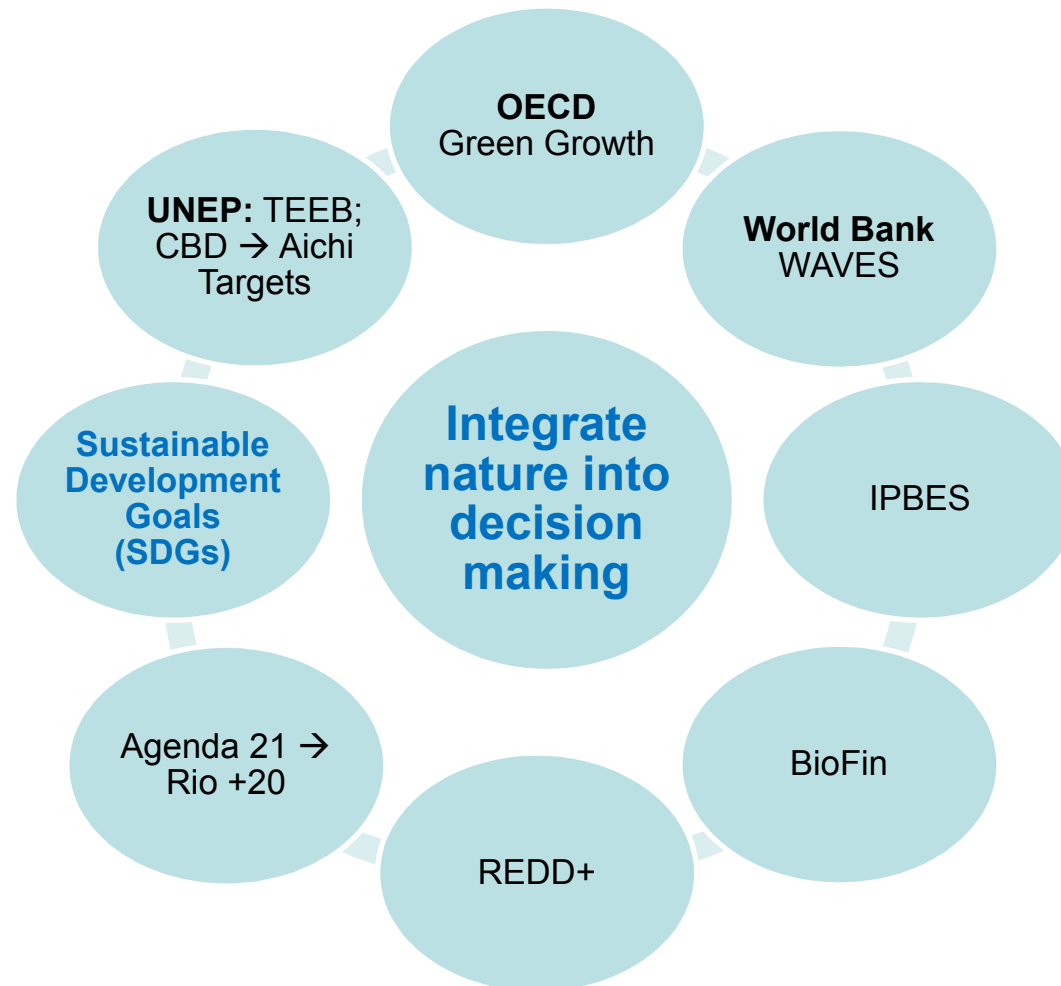
Common view that the Economy exists within Society, which in turn exists within a supporting Environment

Policy decisions related to these three 'pillars' of sustainable development should be integrated rather than taken independently

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International Initiatives for Integration

- OECD Green Growth
- World Bank WAVES
- IPBES
- BioFin
- REDD+
- Agenda 21 → Rio +20
- Sustainable Development Goals (SDGs)
- UNEP: TEEB; CBD → Aichi Targets

Integrate nature into decision making

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National Policy Initiatives for Integration

- Decisions are becoming more integrated:

  - Sustainable development, green economy, climate change, biodiversity preservation, etc.

- Increasing demand to mainstream linkages between environment, society and economy:

  - National development plans include natural heritage, food security, water security, low-carbon…
  - National sustainable development strategies
  - National biodiversity strategies and action plans, etc.

- Strongly encouraged by international community

Integrated Information System for Sustainable Development

Paragraph 38 of Rio+20 Report

"We recognize the need for broader measures of progress to complement GDP in order to better inform policy decisions, and in this regard, we request the UN Statistical Commission in consultation with relevant UN System entities and other relevant organizations to launch a programme of work in this area building on existing initiatives."

Statistics for Sustainable Development

Increasing recognition that Sustainable Development Policy should:

1. **Be based on Evidence:** Policy should, to the greatest extent possible, be informed by rigorously established evidence

2. **Take an Integrated Approach:** Policy should be based on a better understanding of interactions and tradeoffs between the different realms of sustainability

Implication: An information system is needed to support policy analysis and decisions, which provides information on;

- The multiple issues relevant to sustainable development
- The interconnections between these issues

Information is vital
...and it needs to be integrated

- The economy impacts on the environment and the environment impacts on the economy

- To understand these linkages we need to integrate environmental and economic information

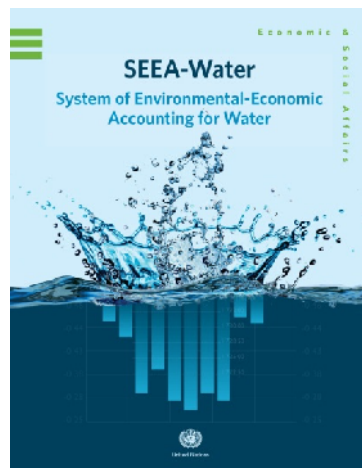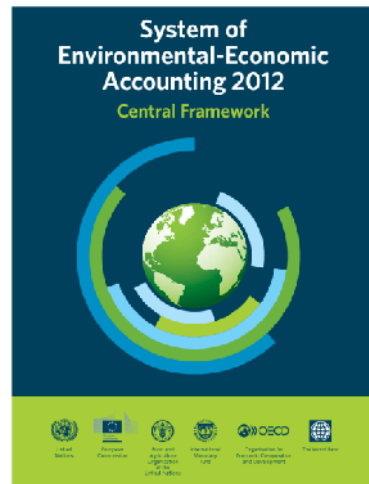- This is the explicit purpose of the SEEA

The System of Environmental Economic Accounting (SEEA)

- An internationally agreed statistical framework to measure the environment and its interactions with economy

- The **SEEA Central Framework** was adopted as an international statistical standard by the UN Statistical Commission in 2012

- The **SEEA Experimental Ecosystem Accounts** complement the Central Framework and represent international efforts toward coherent ecosystem accounting

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The SNA and SEEA: Systems of coherent information:
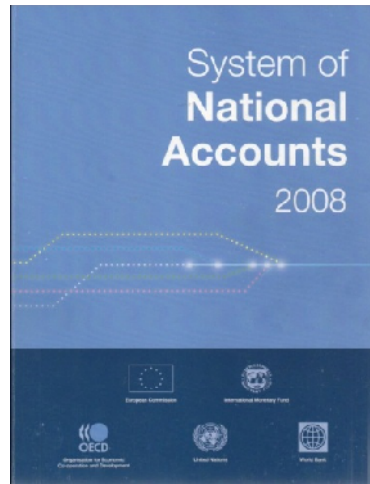
SEEA-Energy	SEEA-Agriculture, Forestry and Fisheries	Others
(forthcoming)	(forthcoming)	(forthcoming)

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Silo Approach → Integrated Statistics

Agency A	Agency B	Agency C
Policy A	Policy B	Policy C
Info A	Info B	Info C
Data A	Data B	Data C

Integrated Statistics pyramid:
- Indicators
- Accounts SNA and SEEA
- Basic data: Economy, Environment, Social
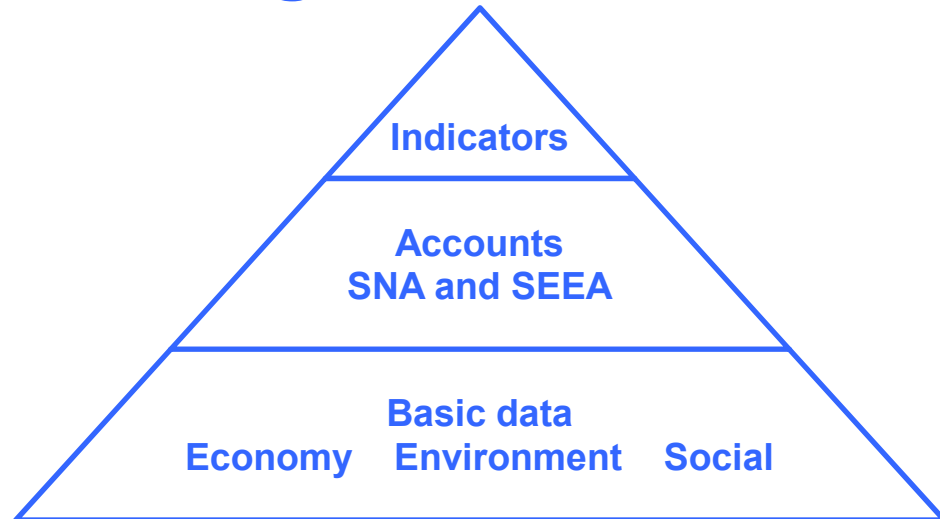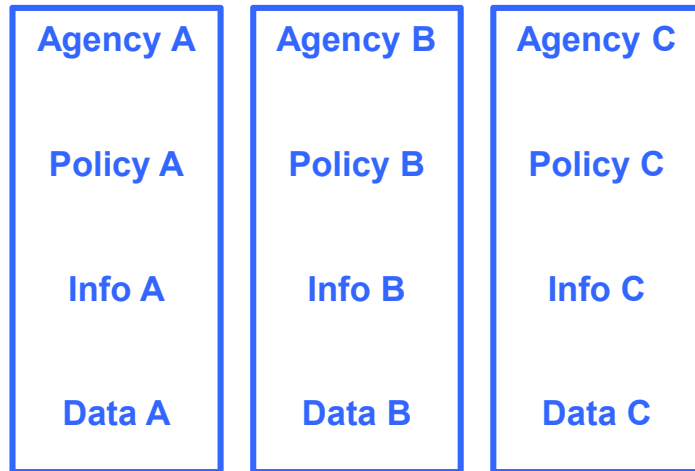
Accounts to integrate statistics:

- Linking policy needs and statistics
- Understanding the institutional arrangements
- Integrated statistical production process/chain and services
- Consistency between basic data, accounts and tables and indicators

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Problem: Information Silos

- Data developed to answer one particular question or problem

- Difficult to figure out if all information is included

- Not always easy to see the whole picture, or how it relates to other things

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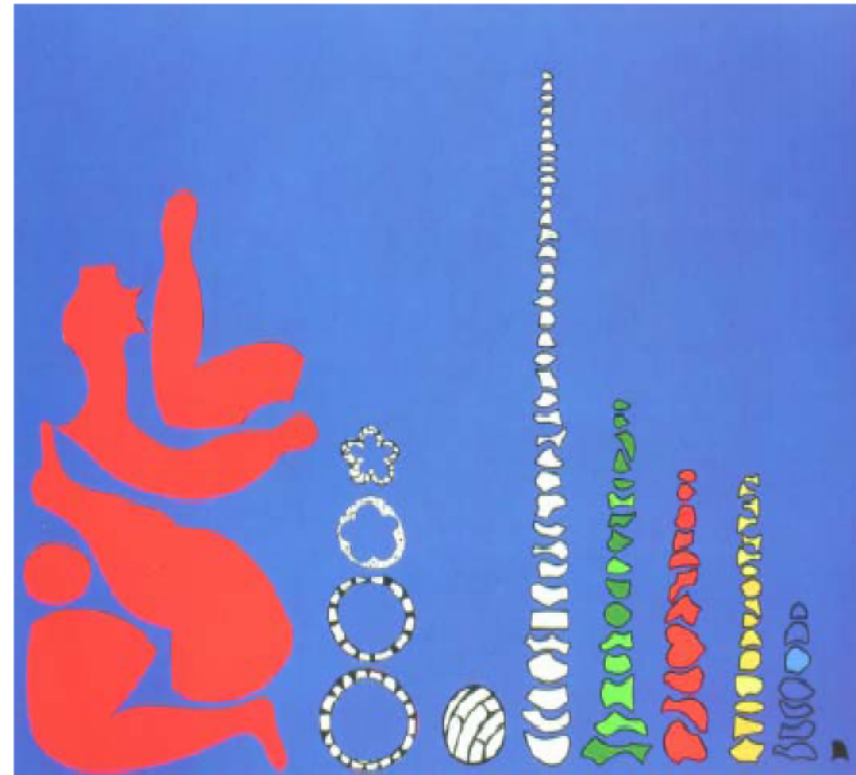
Solution: Integrated Information

- Holistic picture

- Consistency of information and identification of data gaps

- Interconnections between economy, environment and society

One Environment: Two Perspectives

**SEEA
Central Framework:**
Individual Environmental
Assets/Resources

| Timber |
| Water |
| Soil |
| Fish |

**SEEA Experimental
Ecosystem Accounts:**
Ecosystem Assets
(spatially based)

| Forests |
| Lakes |
| Agricultural areas |

*Ecosystem Assets are environmental assets viewed
from a systems perspective*

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SEEA Conceptual Framework

Territory of reference

Environment

Imports/Exports

Economy

Economic Units
-Enterprises
-Households
-Government
-Non-profit institutions

Activities
-Production
-Consumption
-Accumulation

Instruments
-Financial/Monetary
-Taxes/subsidies
- Financing
-Resource rent
-Permits

Outside territory of reference

Analytical and Policy Frameworks
-Productivity analysis
-Natural resource management
-Climate change
-Green Growth/Green Economy
-Post-2015 Development Agenda

Outside territory of reference

Natural inputs

Ecosystem services

Residuals (e.g., emissions, waste)

Individual Environmental Assets (e.g., land, water, mineral and energy, soil, aquatic)

Ecosystem Assets

Transboundary Environmental Flows

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SEEA Conceptual Framework

SNA

SEEA Central Framework

SEEA EEA

Spatial Units (Ecosystem Assets)

Mineral and Energy Resources

Water Resources

Land

Timber Resources

Other ecosystem characteristics

Ecosystem Asset

The SEEA Central Framework Accounts

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

   - physical (e.g. m^2 of water) and/or monetary values (e.g. permits to access water, cost of wastewater treatment, etc.)

2. **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)

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

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SEEA Experimental Ecosystem Approach

- An integrated measurement framework for ecosystem **stocks** (assets) and **flows** (services)

  - It covers "natural" as well as human-dominated systems such as croplands and intensive pastures

  - It takes a detailed spatial approach (maps and statistics)

- A synthesis of current knowledge on ecosystem services, ecosystem condition and related concepts

  - "Experimental" because significant measurement challenges remain and further testing of concepts is needed

SEEA Experimental Ecosystem Approach

Measures the contributions of **ecosystems** to economic and other human activity in an accounting framework:

- Ecosystem Assets and Condition

- "Final" Ecosystem Services (Production):

  - **Provisioning services**: products that can be harvested or extracted from ecosystems

  - **Regulating services**: regulation of biological, hydrological and climate processes

  - **Cultural services**: non-material benefits of ecosystems e.g., tourism or cultural experiences

- With component accounts for Carbon, Biodiversity and Water

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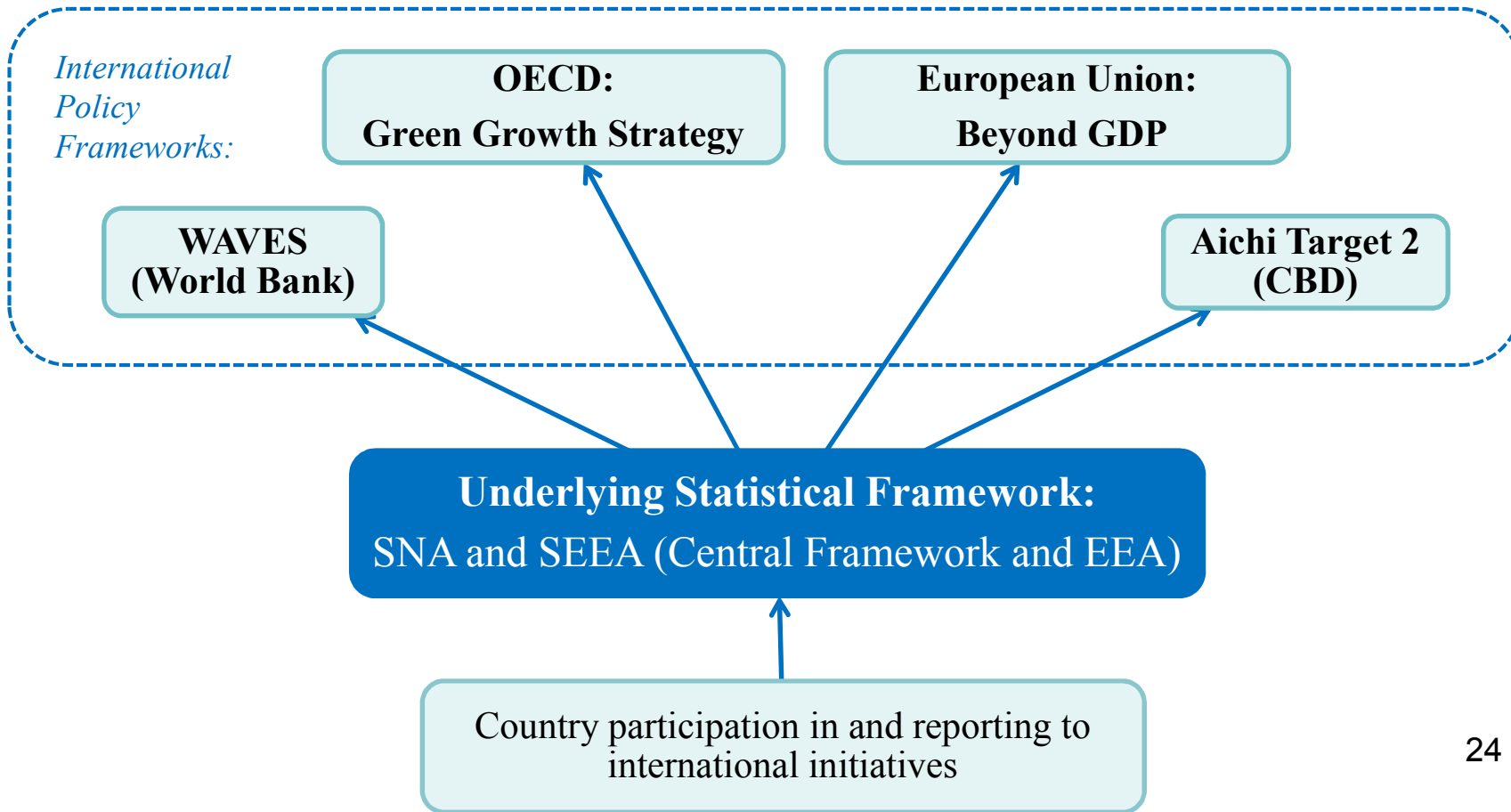# Adoption and Mainstreaming of Standard

SEEA: International Statistical Standard

- Countries are "encouraged to implement the standard"
- International organizations have obligations to assist countries in implementation
- Implementation strategy adopted by Statistical Commission in March 2013
- Data reporting mechanism will be established

Mainstreaming the SEEA Framework in International Initiatives

International Policy Frameworks:

OECD: Green Growth Strategy

European Union: Beyond GDP

WAVES (World Bank)

Aichi Target 2 (CBD)

Underlying Statistical Framework:
SNA and SEEA (Central Framework and EEA)

Country participation in and reporting to international initiatives

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A National Information System to Support Integrated Policy

Vision

National Development Goals

National Economic Development Plan / Planning and Budgetary Processes

Supporting Evidence

Integrated Information System

SNA and SEEA

Presenting integrated economic, environmental, and social dimensions

Sector Strategies and Plans

Water	**Energy**	**Economy**	Oceans / Marine Resources
Climate Change	Education	Tourism	
			Fisheries
Forests	Disaster Reduction	Rural Development	
		Agriculture	Health
Biodiversity	Trade		

Sector statistics

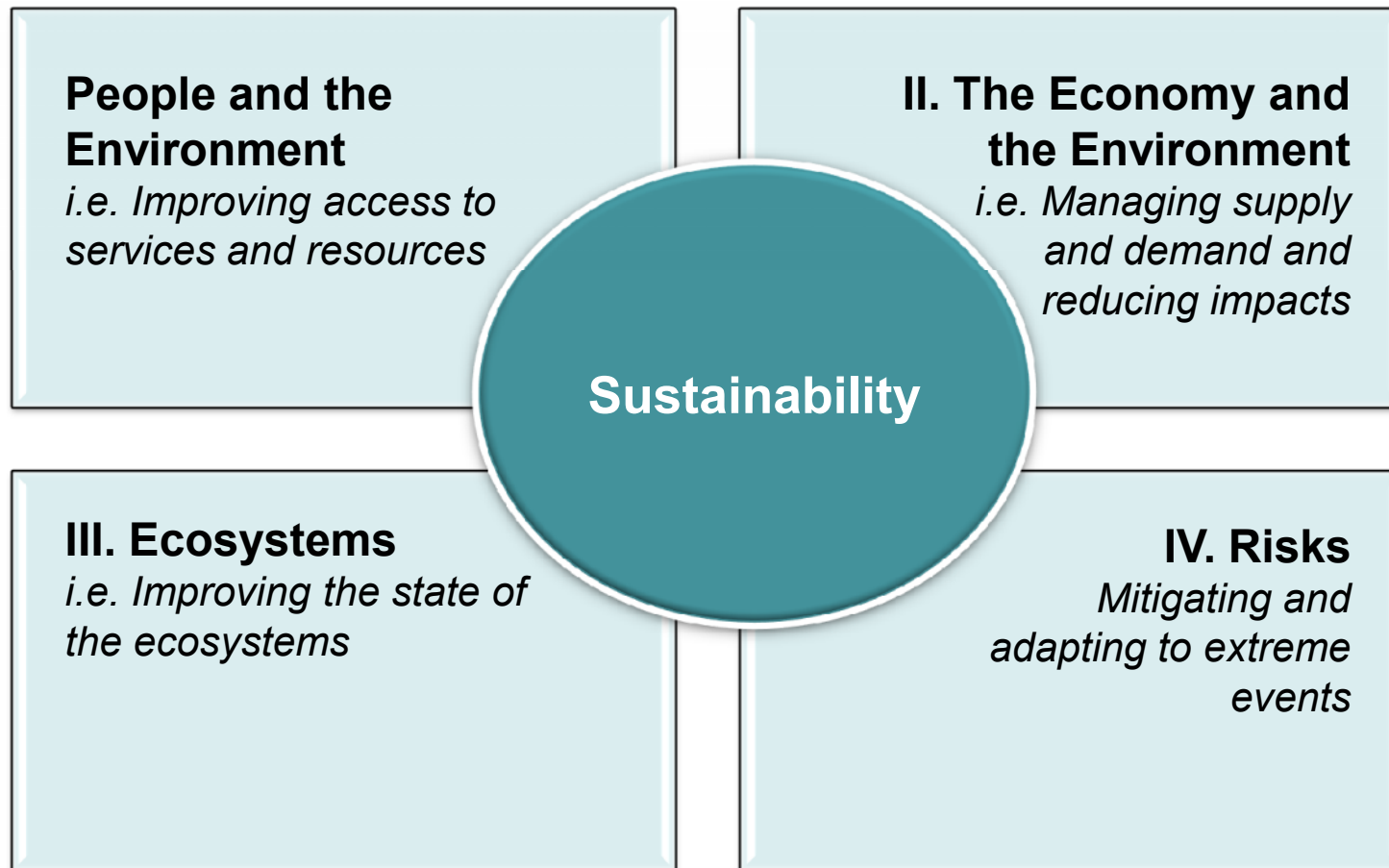|			
Water	Energy	Economy	Forests
Climate Change	Ocean/Marine resources	Agriculture	
		Tourism	
Biodiversity	**Etc. Etc..**	Fisheries	

Adapted from DESA

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Applications

Linking Environmental and Socio-Economic Data

The SEEA is an information system to:

1. Compile indicators that highlight the relationships between the environment and the economy

2. Enable analysis of;

   - Economic Policy ←→Environment

   - Environmental Policy ←→ Economy

3. And provide a quantitative basis for policy design;

   - Identify the socio-economic drivers, pressures, impacts and responses affecting the environment

   - Support greater precision for environmental regulations and resource management strategies

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The SEEA Policy Quadrants

People and the Environment
i.e. Improving access to services and resources

II. The Economy and the Environment
i.e. Managing supply and demand and reducing impacts

Sustainability

III. Ecosystems
i.e. Improving the state of the ecosystems

**IV. Risks**
Mitigating and adapting to extreme events

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Global SDG Indicators and the SEEA

- The SEEA is an important statistical framework for monitoring the SDGs.

- The SEEA provides a statistical framework to calculate indicators for many SDGs in an integrated way
  - Helps support integrated policy decisions and understanding of trade-offs between different goals

- Using the SEEA to calculate SDG indicators can result in higher quality indicators in terms of;
  1. Policy Relevance
  2. Methodological Soundness
  3. Practicality and Measurability

Integrated SDG Indicators: SEEA
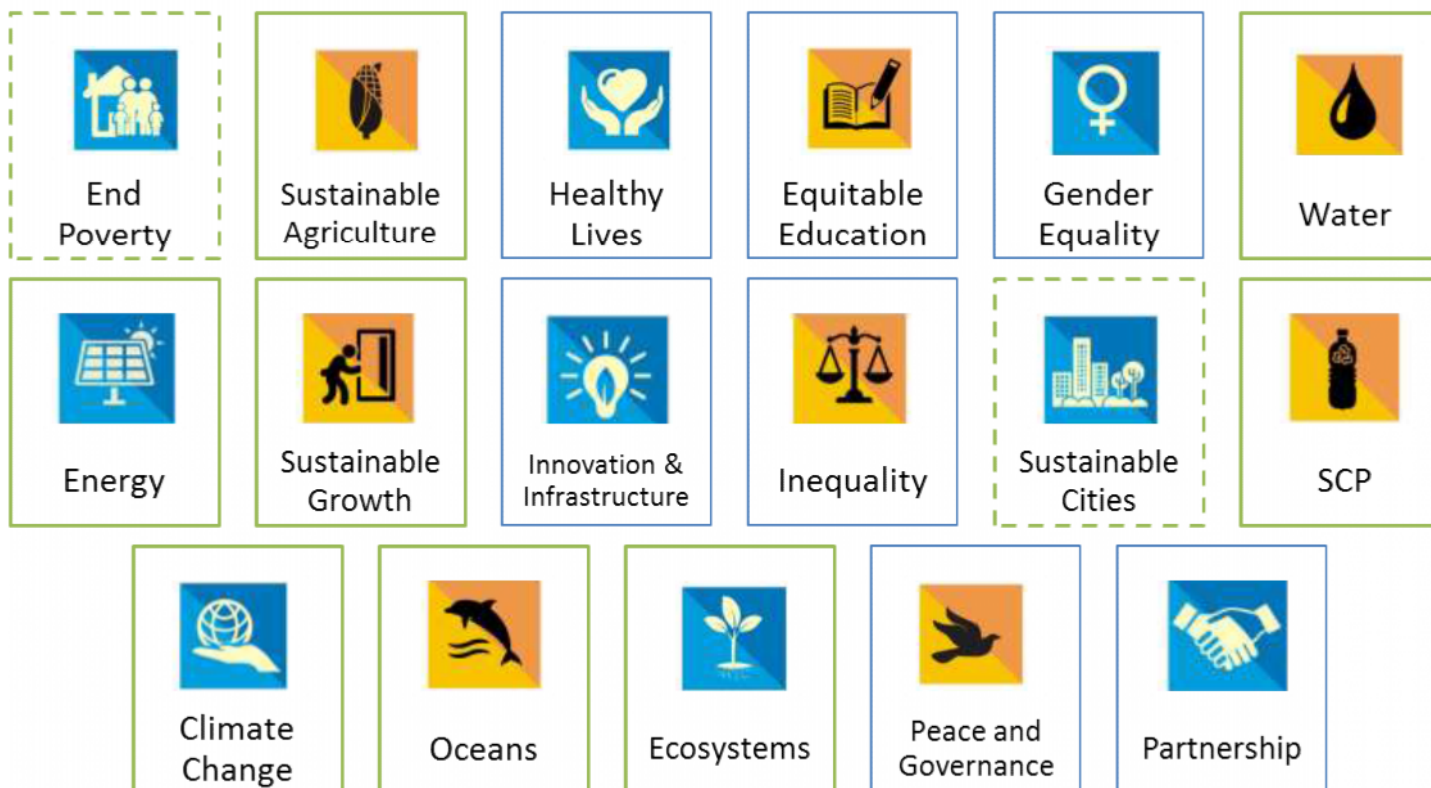
Example: Target 6.4

*"by 2030…..**ensure sustainable withdrawals** and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity."*

Indicator Proposed: Water Stress

- Ratio of total water withdrawals to available water (total actual renewable freshwater resources)

Informed provided by Accounts:

▪The asset accounts for water;

- Show changes in stocks of inland water resources over an accounting period, attributing these either to human or environmental flows

- The use of asset accounts over time will provide key information on water levels, and the extent to which stocks are being depleted over time

- The evolution of the changes in stocks, and in particular the extent to which human pressures are causing reductions in stocks of water can also be monitored

▪SEEA-Water can be adjusted to calculate renewable resources

Example: Supporting Integrated Policy

Target 6.5 calls for implementation of **integrated water resources management**;

▪The SEEA can be a tool to facilitate this by bringing together information relevant to the four key quadrants of water policy objectives;

I. IMPROVING WATER SUPPLY AND SANITATION SERVICES

→ *Policies that aim to ensure the population has access to safe water as well as to means of disposing wastewater*
→ *SDG Targets 6.1, 6.2 and 6.3 (partial)*

II. MANAGING WATER SUPPLY AND DEMAND

→ *Policies that aim to improve water allocation to satisfy societal needs without compromising the needs of future generations or the environment*
→ *SDG Targets 6.3, 6.4 and 6.5*

WATER SECURITY

III. IMPROVING THE STATE OF THE ENVIRONMENT AND WATER RESOURCES

→ *Policies that aim to preserve or improve the quality of water resources and aquatic ecosystems*
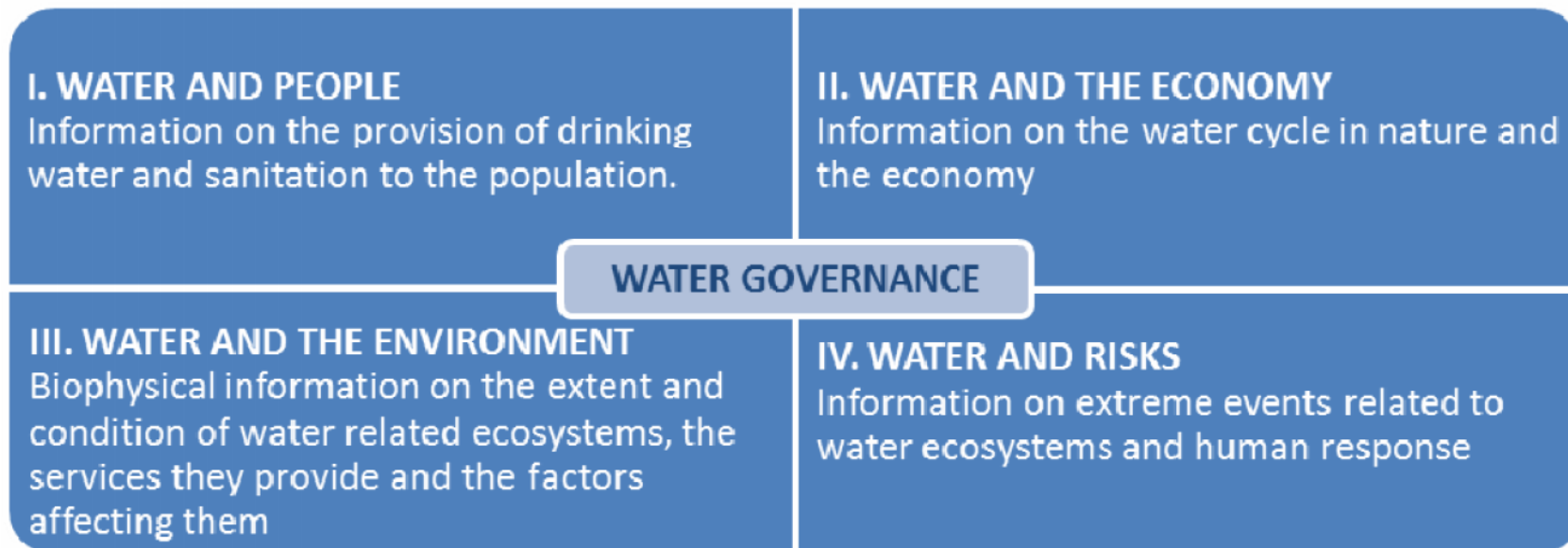→ *SDG Targets 6.3 and 6.6*

IV. ADAPTING TO EXTREME HYDRO-METEOROLOGICAL EVENTS

→ *Policies that aim to reduce the socioeconomic impact of water related disasters*
→ *SDG Targets 6.5 and 6.6*

Example: Supporting Integrated Policy

Four quadrants of information correspond to these policy objectives:

I. WATER AND PEOPLE
Information on the provision of drinking water and sanitation to the population.

II. WATER AND THE ECONOMY
Information on the water cycle in nature and the economy

WATER GOVERNANCE

III. WATER AND THE ENVIRONMENT
Biophysical information on the extent and condition of water related ecosystems, the services they provide and the factors affecting them

IV. WATER AND RISKS
Information on extreme events related to water ecosystems and human response

This information is bought together in the SEEA-Water accounts in an integrated way (see next slide)

Example: Supporting Integrated Policy

Accounts	Quadrants
Physical Supply and Use Tables: Flows (i.e. volumes) of water abstracted from the Environment, used in the Economy and discharged back into the Environment	I II
Emissions Accounts: Quantity of water pollutants discharged from Economy to Environment; directly or via wastewater through treatment	II III
Asset Accounts: Stocks of water resources in the Environment and changes in those stocks due to natural and economic (i.e. human) causes	II
Combined Presentations: Linking information on water volumes with monetary information on the production and consumption of water-related products	I II
Economic Accounts: Sources of financing, channels of cost recovery, payment for water rights, etc.	All
Ecosystem Accounts: Water-related ecosystems including their characteristics and provision of ecosystem services	III IV

Matching SDGs with SEEA accounts (1)

SDGs	Targets	SEEA accounts	Indicators
15.1	by 2020 ensure conservation , restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	Ecosystem extent accounts	Proportion of land area covered by forests, wetlands, mountains and drylands
		Ecosystem service and condition accounts	Degradation of designated terrestrial and inland freshwater ecosystems (Decline in the expected ecosystem service flows/conditions in designated terrestrial and inland freshwater ecosystems)
15.2	by 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests, and increase afforestation and reforestation by x% globally	Ecosystem extent, service and condition accounts	Proportion of land area covered by forests
15.3	by 2020, combat desertification, and restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world	Ecosystem extent accounts	Land used for maintenance and restoration of environmental functions
		Ecosystem service and condition accounts	Degradation of designated land area (Decline in the expected ecosystem service flows/conditions in designated land area)

Matching SDGs with SEEA accounts (2)

SDGs	Targets	SEEA accounts	Indicators
15.4	by 2030 ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their capacity to provide benefits which are essential for sustainable development	Ecosystem service and condition accounts	Degradation of designated mountain ecosystems (Decline in the expected ecosystem service flows/conditions in designated mountain ecosystems)
15.5	take urgent and significant action to reduce degradation of natural habitat, halt the loss of biodiversity, and by 2020 protect and prevent the extinction of threatened species	Biodiversity accounts	Species abundance indices disaggregated by ecosystem types
		Biodiversity accounts	Threatened species disaggregated by IUNC Red List categories
		Ecosystem service and condition accounts	Degradation of designated natural habitat area (Decline in the expected ecosystem service flows/conditions in designated natural habitat area)
15.6	ensure fair and equitable sharing of the benefits arising from the utilization of genetic resources, and promote appropriate access to genetic resources	Ecosystem services accounts	Provisioning services (genetic resources) provided by designated type of ecosystems

Matching SDGs with SEEA accounts (3)

SDGs	Targets	SEEA accounts	Indicators
15.8	by 2020 introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems, and control or eradicate the priority species	**Ecosystem services accounts**	Regulatory services (pest and disease control incluing invasive alien species) provided by designated land and water ecosystems
15.9	by 2020, integrate ecosystems and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts	**Ecosystem accounts**	Country implements and reports on SEEA Experimental Ecosystem Accounting
15.a	mobilize and significantly increase from all sources financial resources to conserve and sustainably use biodiversity and ecosystems	**Environmental protection expenditure accounts**	Level of national expenditure on environmental protection, disaggregated by environmental activity domain (biodiversity and ecosystems) and by institutional sector
			Level of national expenditure on finance resource management and preservation, disaggregated by environmental activity domain (biodiversity and ecosystems) and by institutional sector
15.b	mobilize significantly resources from all sources and at all levels to finance sustainable forest management, and provide adequate incentives to developing countries to advance sustainable forest management, including for conservation and reforestation	**Environmental protection expenditure accounts**	Level of national expenditure on environmental protection, disaggregated by environmental activity domain (sustainable forest management) and by institutional sector

Key Points

SEEA is an important tool for monitoring the SDGs supporting policy towards meeting targets.

The Accounting structure improves robustness to a set of general criteria for SDG indicators improving quality;

▪**Policy relevance:** Indicators are supported by organized information which promotes a detailed understanding of the drivers of change

▪**Methodological Soundness:** SEEA acts as a vehicle for harmonizing methodological inconsistencies across the environmental data production process, and enables coherent comparison of environment statistics with economic statistics

▪**Practicality:** SEEA can create efficiencies in the data production process

THANK YOU

Resource use and environmental efficiency

- Efficiency indicators compare trends in economic activity
  - such as value-added, income or consumption with trends in specific environmental flows such as emissions, energy and water use, and flows of waste
- <u>Intensity</u> indicators -- ratio of the environmental flow to the measure of economic activity
- <u>Productivity</u> indicators -- inverse of intensity.

Resource use and environmental efficiency

- Efficiency indicators—two broad categories

- Environmental efficiency indicators characterise the environmental and economic efficiency with which pollutants and other residuals generated in production and consumption are mitigated, controlled and prevented. They are usually expressed as intensity or productivity ratios.

- Resource efficiency indicators characterise the efficiency with which natural resources, including water, energy and other materials are used in production and consumption. They are usually expressed as intensity or productivity ratios. They relate environmental variables such as the extraction, supply or consumption of natural resources and materials to economic variables such as output, income and value added.
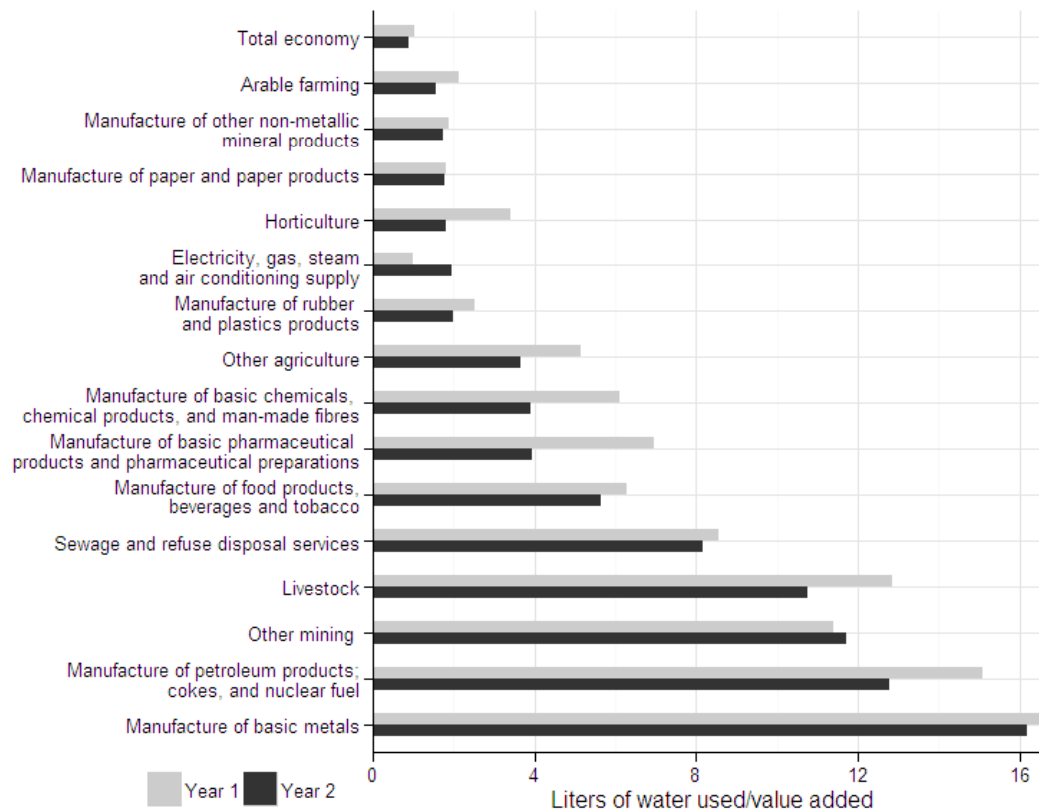
Resource use and environmental efficiency

- Environmental efficiency indicators
  - Greenhouse Gas (GHG) or CO2 productivity
  - Air pollutant emission intensities
  - Water pollution intensities
- Resource efficiency indicators
  - Material productivity or intensity indicators
  - Energy productivity or intensity indicators
  - Water use productivity or intensity indicators
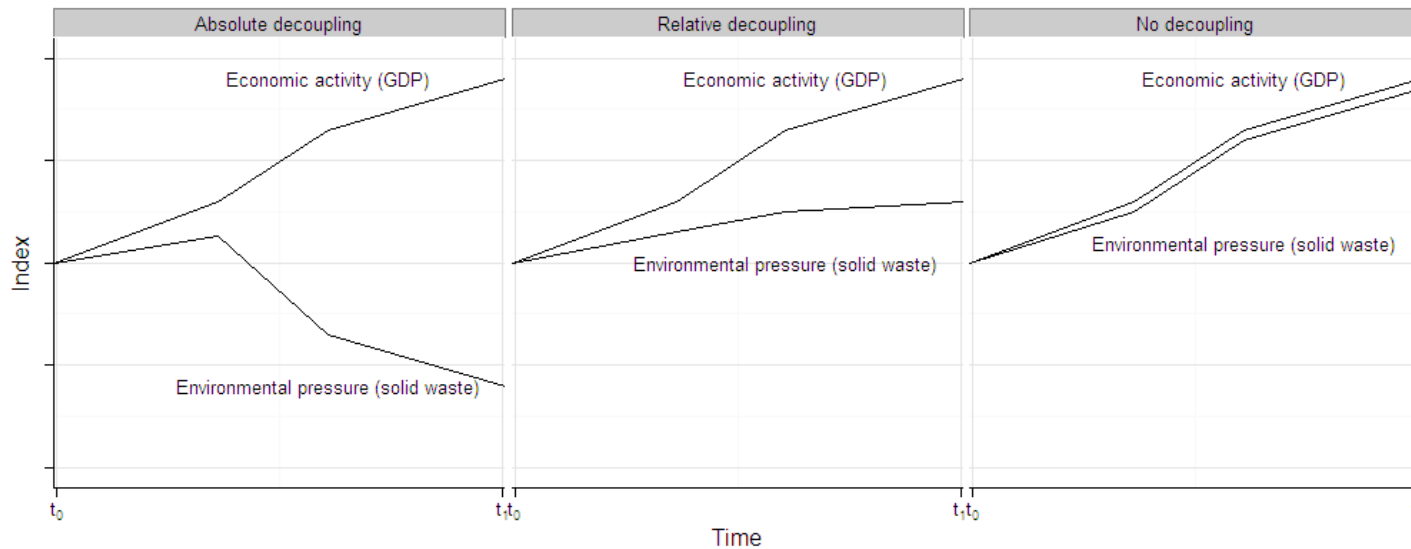
Resource use and environmental efficiency-example

Industry level water use intensity indicators

Resource use and environmental efficiency-decoupling

•Absolute: growth in the environmentally relevant variable is flat or decreasing while economic activity increasing
•Relative: growth rate of the environmentally relevant variable is positive but less than the growth rate of the economic variable

Resource use and environmental efficiency-decomposition

Decomposition of changes in CO2 emissions
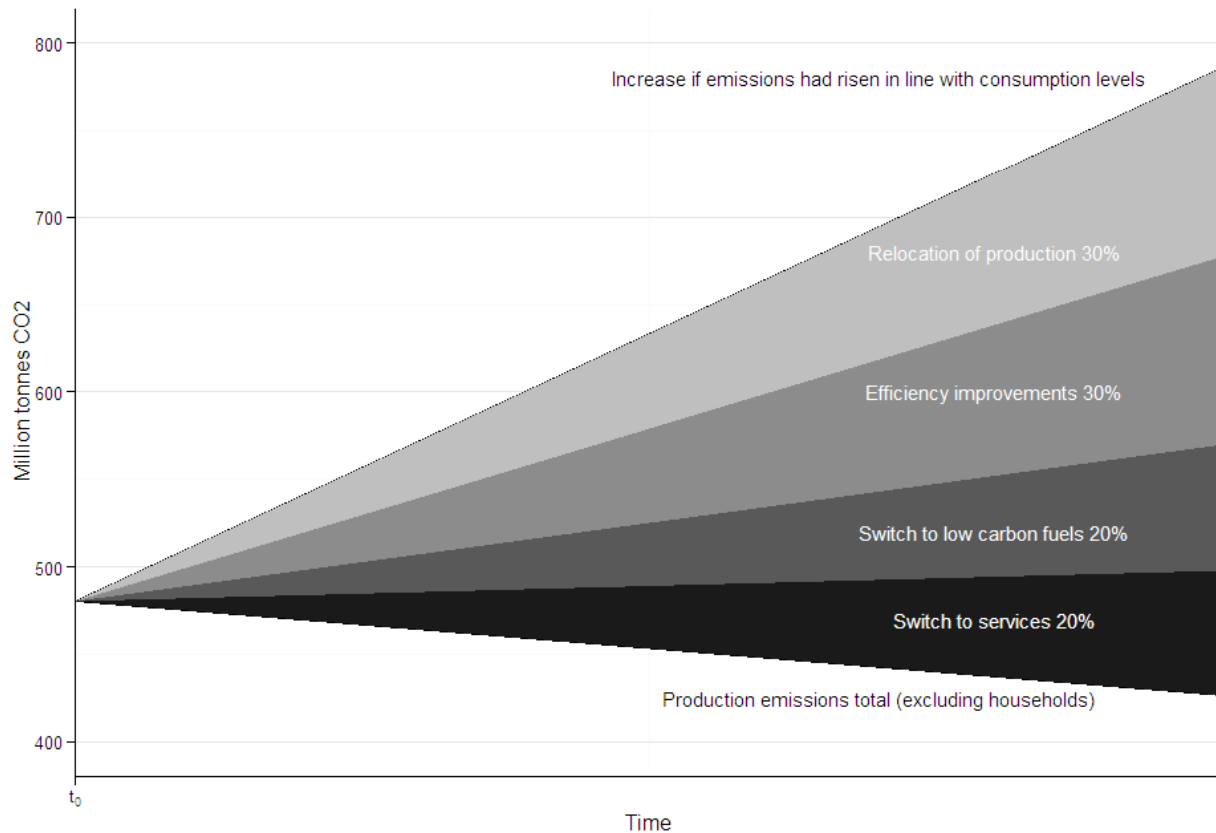
Taxes-example

Environmental tax revenue by type and as % of GDP