Natural Capital Accounting for mainstreaming climate change in decision making

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a) Observed global temperature change and modeled responses to stylized anthropogenic emission and forcing pathways

Global warming relative to 1850-1900 (°C)

- **Observed monthly global mean surface temperature**
- **Estimated anthropogenic warming to date and likely range**

**Likely range of modeled responses to stylized pathways**
- Global CO₂ emissions reach **net zero in 2055** while net non-CO₂ radiative forcing is **reduced after 2030** (grey in b, c & d)
- **Faster CO₂ reductions** (blue in b & c) result in a higher **probability** of limiting warming to 1.5°C
- **No reduction** of net non-CO₂ radiative forcing (purple in d) results in a **lower probability** of limiting warming to 1.5°C

Source: IPCC
Global Greenhouse Gas Emissions by Gas

- Carbon Dioxide (fossil fuel and industrial processes) 65%
- Methane 16%
- Acid gases 11%
- Nitrous Oxide 6%
- F-gases 2%

Global Greenhouse Gas Emissions by Economic Sector

- Agriculture, forestry and other land use 24%
- Industry 21%
- Transportation 14%
- Buildings 6%
- Other energy 10%
- Electricity and heat production 25%

2014 Global CO₂ Emissions from Fossil Fuel Combustion and Some Industrial Processes

- China 30%
- United States 15%
- EU-28 9%
- India 7%
- Russia 5%
- Japan 4%
- Other 30%

Source: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data
THE PARIS CLIMATE AGREEMENT: KEY POINTS

Temperatures 2100
- Keep warming ‘well below 2C’
- Continue efforts to limit the rise in temperatures to 1.5C

Financing 2020-2025
- Rich countries must provide $US100bn from 2020, as a ‘floor’
- Amount to be updated by 2025

Burden sharing
- Developed countries must provide financial resources to help developing countries
- Other countries are invited to provide support on a voluntary basis

Climate-related losses
- Vulnerable countries have won recognition of the need for ‘averting, minimising and addressing’ losses suffered because of climate change

Specialisation
- Developed countries must continue to ‘take the lead’ in the reduction of greenhouse gases
- Developing nations are encouraged to ‘enhance their efforts’ and move over time to cuts

Emissions goals 2050
- Aim for greenhouse gas emissions to peak ‘as soon as possible’
- From 2050: rapid reductions to achieve a balance between emissions from human activity and the amount that can be captured by ‘sinks’

Review mechanism 2025
- A review every five years. First mandatory world review 2025
- Each review to show an improvement compared with the previous period
How to decide what to do?
<table>
<thead>
<tr>
<th>Asset accounts</th>
<th>Economic Asset Accounts</th>
<th>Environmental Asset accounts</th>
<th>Thematic Ecosystem Accounts</th>
<th>Ecosystem Asset Accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produced assets and (non-)financial balance sheet items.</td>
<td>Stocks, and annual additions and reductions of land, carbon, water, nutrients, forest, soil, biodiversity and species.</td>
<td>Stocks, and annual additions and reductions of minerals, energy resources, land, timber, aquatic resources, soil, water, biological resources.</td>
<td>Ecosystem extent (size), condition (quality), future flow of ecosystem services.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow accounts</th>
<th>Economic Supply &amp; Use Tables</th>
<th>Environmental Supply &amp; Use Tables</th>
<th>Ecosystem Supply &amp; Use Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transactions by residents in the National Economy and income.</td>
<td>Supply and use flows for energy, water, materials, incl. waste and emissions to soil, air and water.</td>
<td>Supply and use flows for environmental and economic activities that lead to environmental protection and resource management.</td>
<td>Transactions to protect the environment and economic activities that lead to environmental protection and resource management.</td>
</tr>
</tbody>
</table>
Types of climate change policies

Mitigation

- Trends in greenhouse gas emissions?
- Trends in emissions embodied in trade?
- Trade-offs between LULUCF and emissions?
- Sectoral shifts due to emission policies?
- Synergies between climate and air quality policies?
- Impacts of fiscal greening?
- Impacts of landfill policies?

Adaptation

- Trends in water availability, water use, flooding/drought probabilities?
- Trends in agricultural productivity?
- Relationships between soil erosion and climate change?
- Relationship between water availability and economic development?
- Impacts of water management policies?
- Effectiveness of urban adaptation programmes?

Water management

Emissions from fossil fuel use

Deforestation

Livestock and agriculture

Waste handling

Embodied emissions

Nature management

Prepare cities and infrastructure
<table>
<thead>
<tr>
<th>SEEA Ecosystem Accounts</th>
<th>SNA</th>
<th>Economic SUT &amp; Labour, techn, agric., energy,...</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEEA Central Framework</td>
<td>EPEA/ EGSS/ Tax / Subs.</td>
<td>Activities and transactions to protect the environment and manage natural resources</td>
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<tr>
<td>Supply and Use Tables</td>
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<td>Flows of energy, water, materials</td>
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<td></td>
<td>Flows of waste and emissions to soil, air and water</td>
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<tr>
<td>Asset Accounts</td>
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<td>Stocks of minerals, (renewable) natural resources, timber, water</td>
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<td>Land use and land cover</td>
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<tr>
<td></td>
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<td>Stocks of carbon, soils and nutrients</td>
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<td></td>
<td></td>
<td>Stocks of biodiversity and species</td>
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<tr>
<td>Thematic Ecosystem</td>
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<td>Extent of ecosystems (size)</td>
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<td>Accounts</td>
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<td>Condition of ecosystems (quality)</td>
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<td>Future flow of ecosystem services (capacity to generate future flows)</td>
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<td>Ecosystem Asset Accounts</td>
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<td>Supply and use of ecosystem services</td>
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<td>Greenhouse gas emissions per sector and source</td>
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<td>Climate related activities, expenditures, taxes, subsidies,...</td>
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<td>Relation energy use – greenhouse gas emissions</td>
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<td>Adapt agricultural policies</td>
</tr>
</tbody>
</table>
EU
- Air emission account
- Material flow account
- Environmental tax account
- Physical energy flow account
- EPEA
- EGSS

Netherlands
- Air emission and energy accounts for forward looking analysis in the National Energy Outlook
- Water accounts for adaptation planning at municipal and river basin level

Colombia:
- Air emission accounts, EPEA, ReMEA to monitor emission

Indonesia
- Forward look System Dynamics Model, integrating resource scarcity, ecosystem services and carrying capacity
- Macro-economic model for Midterm Development Plan looking at sustainability

Zambia
- Water accounts for identifying and monitoring adaptation needs.
Lessons

› Current focus is on measuring emissions and energy use.

› Less focus on emissions from LULUCF, agriculture, waste and trade.

› Limited attention for using NCA for adaptation.
  – Is disaggregation sufficiently detailed?
  – Do subnational users have access to the data?

› Accounts also for broader sustainability assessments.
Lessons

› Choose your accounts wisely; for mitigation one normally needs other accounts than for adaptation.

› A snowball effect may lead to increased use. Accounting provides a basis for cooperation.

› Developed and developing economies can learn from each other.
Thank you