

Summary

The Paris climate agreement represents a new paradigm, with nationally determined contributions (NDCs) central to the global response to climate change. Natural capital accounts, with their integrated physical and monetary data, have the potential to inform choices on adaptation and mitigation options, before they are included in NDCs. Furthermore, activity accounts may help monitor climate finance for implementing NDCs.

Background

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Accounting for the Paris climate agreement

The UNFCCC Paris Agreement sets out an iterative process where countries must regularly submit nationally determined contributions (NDCs) to the global response to climate change. Progress towards mitigating and adapting to climate change is tracked, while global stocktakes assess if these NDCs are doing enough to limit climate change to well below 2 degrees Celsius. There is a need for integrated information systems, such as natural capital accounts, that can bring together physical and economic data to inform the choices for adaptation and mitigation actions selected for inclusion in NDCs.

Natural capital accounts follow international statistical standards organizing data into a form that can be analyzed with other statistics such as economic growth or employment figures. Because of this, the accounts can:

- Facilitate analysis of climate change and development-related actions, synergies and trade-offs between different parts of society
- Support the monitoring of climate finance and climate-related environmental activities by government, business and others.
- Highlight the economic vulnerability to climate change of critical natural resources such as forests and water, or environments such as coastal areas

The Paris Agreement

In December 2015, after 20 years of negotiations, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) came to an agreement in Paris on how to address climate change. The 'Paris Agreement' had been given impetus by the publication of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report in 2014, in which a panel of the world's leading scientists highlighted the urgent need to take action.¹

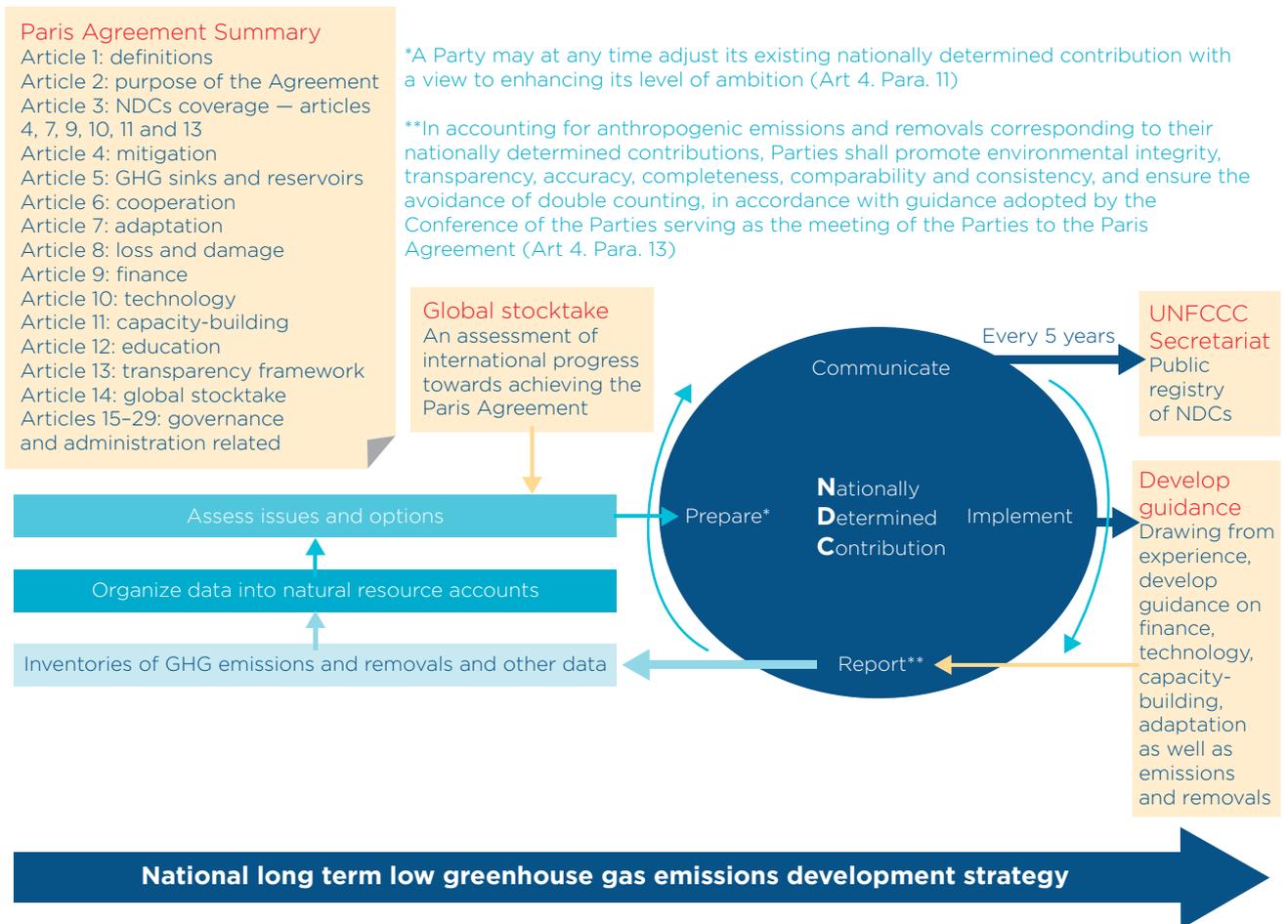
The Paris Agreement marks a new paradigm in international affairs and the global response to climate change. Rather than seeking legally binding targets, the agreement sets out an iterative process where countries regularly submit nationally determined contributions (NDCs) to the global response to climate change, adaptation and mitigation actions are implemented and progress is tracked. Global stocktakes will assess if NDCs are enough to sustain development and limit climate change to well below 2 degrees Celsius. Importantly, details of a country's plans for adaptation can be included in NDCs.

In addition to mitigation and adaptation, Article 2 of the agreement, regarding its aim, includes the need for suitable finance. Mitigation, adaptation and finance are therefore key elements within the agreement, highlighting a need for supporting data and

information. Specifically, data should be transparent, accurate, complete, comparable, consistent, avoid double counting and promote environmental integrity. Natural capital accounts (NCA) meet all these criteria but may differ from UNFCCC reporting guidelines in some cases.

Natural capital accounting

Natural capital accounting is the process of organizing data into stocks and flows and physical and monetary measures, and defining benefits and beneficiaries of natural resources. Natural capital accounts identify the economic units, from businesses to households, which supply and use these resources and generate waste. The System of Environmental Economic Accounting 2012 (SEEA 2012) is the international statistical standard used to compile these types of accounts, and is based on years of research, a process of review and finally, adoption at the United Nations Statistical Commission in March 2012. The power of the accounts is in the analyses that can be undertaken in support of preparing NDCs, eg to assess mitigation and adaptation options and track climate finance, including government expenditure and climate finance from other sources. A key strength of the environmental accounts is that they are aligned with the System of National Accounts, thus enabling clear links to economic management tools.



*A Party may at any time adjust its existing nationally determined contribution with a view to enhancing its level of ambition (Art 4. Para. 11)

**In accounting for anthropogenic emissions and removals corresponding to their nationally determined contributions, Parties shall promote environmental integrity, transparency, accuracy, completeness, comparability and consistency, and ensure the avoidance of double counting, in accordance with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (Art 4. Para. 13)

Figure 1. Summary of the Paris Agreement and its main elements related to natural capital accounts

While natural capital accounts, like any data set or system for organizing data, have their limitations, the examples provided give a sense of the policy applications that might be addressed. In Australia, for example, the Australian Bureau of Statistics (ABS) brought together several thematic areas related to climate adaptation, including changes in water availability, the role of forestry in carbon sequestration, impacts of climate change on fisheries and other coastal systems including the Great Barrier Reef. It gathered data on energy and natural disaster preparation and management and information on climate adaptation expenditures.²

Box 1 provides information on how to select accounts to develop.

Accounting for carbon sources and sinks

According to Article 5 of the Paris Agreement, countries “...should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases...”³ including biomass contained in forests and oceans as well as other ecosystems. Natural capital accounts provide data highlighting how natural capital such as forests and certain kinds of land use can remove carbon from the atmosphere and store it, serving as a ‘carbon sink’.

In **Canada** for example, the Canadian Forest Service prepared a carbon budget for forests to inform better forest management. While there had

Box 1. Linking natural capital accounts to national climate strategies and contributions

1. Identify climate change policies, NDC options or analyses for which environmental economic data might be useful.
2. Assess the degree to which the relevant natural capital accounts have been used to develop NDCs and policies in other countries (ie check the approach is right for you).
3. Undertake an assessment of available survey and administrative data sources from across government departments, along with supplementary sources of data from research organizations, industry associations, development partners and other sources.
4. Liaise with respective policy agencies, ensuring the data being developed is suitable for their NDC and climate policy analytical needs.
5. If enough data are available, assign staff with a mix of national accounting and environment statistics experience and start preparation of natural capital accounts.
6. Publish accounts along with supporting information describing the data and how it was prepared.
7. Assess adaptation, mitigation and financing options for inclusion in NDCs, for example related to energy, forestry, manufacturing, transport or water.

Note: if considering NCAs for monitoring of adaptation, mitigation actions or climate finance, ensure the accounts comply with relevant guidance documents under the UNFCCC and Paris Agreement. Otherwise access to climate finance and mechanisms under the UNFCCC may be restricted.

been growing awareness of forests' role in carbon sequestration in the late 1990s, forest users needed operational models to understand the net carbon balance of their forests, apply for certification and meet national and international commitments. In 2002 the carbon accounting team at the Canadian Forest Service, in partnership with a network of researchers, began work on a user friendly operational model that became known as the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3). The model was initially piloted in two forests and then elsewhere. The completed version was released free of charge to the forestry community in 2005, along with a user's guide and training materials. The model can be used to assess different management regimes according to their impacts on carbon emissions, and to vary climate and environmental conditions to assess impacts on emissions.⁴

In developing countries, similar use of forest accounts could inform international payments through incentive mechanisms such as REDD+, which requires data on forest carbon stocks and emissions to assess compensation levels. Such accounts can also be used to assess the impacts of land use policies on carbon sources and sinks — relating to agriculture and the question of expansion versus intensifications, for example.

Accounting for energy related emissions

Natural capital accounts can be coupled with economic models to assess the impact of possible carbon taxes on households and businesses.

In **New Zealand** the Treasury undertook analyses of a proposed carbon tax including the impact this would have on households (by income bracket, number of adults and children) and businesses (by

economic activity). Because New Zealand had physical and monetary accounts for energy related greenhouse gas emissions, the Treasury was able to test carbon tax rates of US\$7, US\$15 and US\$25 per tonne of carbon dioxide, and use economic models to assess increased costs to households.⁵ Furthermore, the Treasury was able to assess the carbon tax level with the least disruption to industries relative to greenhouse gas emissions reductions required.⁶

Greenhouse gas emissions data reconfigured into natural capital accounts can facilitate detailed analyses of carbon taxes, prices and market mechanisms (Figure 2) aimed at minimizing land use change. Such analyses will be important for any country considering a carbon price as part of the NDC.

Natural capital accounts can help monitor structural changes in economies related to climate change.

For example, if market or non-market mechanisms are used to reduce the carbon intensity of fuel types and technologies within an economy, accounts can be used to monitor structural changes at the level of industries and link these changes with energy-related GHG emissions trends.

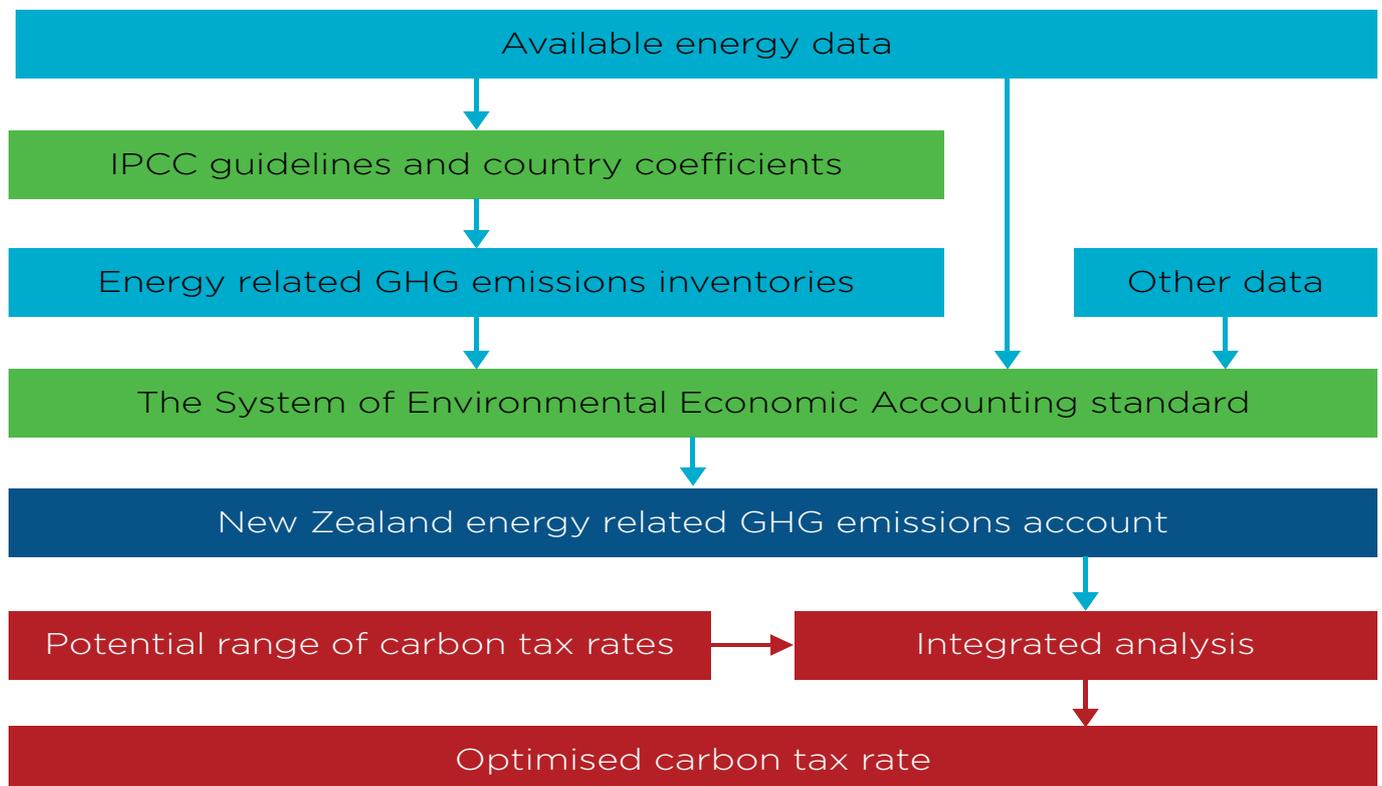
Accounting for water

According to the IPCC Fifth Assessment Report, “Changes in the global water cycle in response to the warming over the 21st century will not be uniform. The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions.”⁷

Natural resources such as water are expected to become more variable affecting agriculture, energy and other water intensive activities.

Water accounts can provide detailed information on stocks and flows of

Figure 2. Summary of data sources (light blue) and standards (green) used to create the New Zealand energy-related GHG emissions account (dark blue) that supported the analysis undertaken by the New Zealand Treasury (red) on carbon taxes



Box 2. Water accounts inform modelling of climate change in South Africa

The South African Treasury (equivalent to the Ministry of Finance) with United Nations support has modelled the economic impacts of climate change on the economy. The objective is to assess the economic impacts of climate change from the year 2014 to 2050. The model uses dynamic computable general equilibrium models with a focus on agriculture and the water sector. This emphasis is justified as the Treasury notes that rural poverty is located in areas of dryland agriculture. The model uses a detailed set of water accounts including river basin models and water demand and supply models. The results are that the short term impacts of climate change are limited, but by 2050 the impacts are quite significant. The analysis by the Treasury recommends improved water resource management to mitigate some of the climate impacts.

water and how it is used by different parts of the economy, including households, and as a result, how much these water users contribute to the economy. This information can help governments decide how to allocate water most efficiently and how to adapt development strategies to changing water availability. Currently, more than two dozen countries compile water accounts. Australia, Canada, Colombia, Mexico and the Netherlands have been pioneers in this area. But developing countries, including South Africa, Costa Rica, Botswana and Rwanda are starting to play a role.

In **Botswana**, for example, the accounts have revealed that competition for water use is growing, with the agricultural sector being the highest user of water while contributing the least to GDP and formal employment. Having this data has prompted new measures to improve water efficiency through managing demand and thinking

more strategically around issues such as economic diversification. The same is true for South Africa (see Box 2).

Water will be a central element of adaptation plans in years to come. Having integrated physical and monetary data allows powerful analysis of water supply and demand along with options for managing water resources within a suite of adaptation and mitigation (in the case of hydro-electricity) actions.

Accounting for coastal areas

According to the IPCC Fifth Assessment Report, “Due to sea level rise projected throughout the 21st century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding, and coastal erosion...”.⁸ Because coastal systems are complex with human, economic and environmental elements, an integrated approach is

Box 3. A natural capital approach to climate adaptation scenarios in Belize

The Belize Coastal Zone Management Authority and Institute with support from the Inter-American Development Bank and World Wildlife Fund analyzed a set of integrated responses to climate change for the Placencia coastal region of Belize. Natural capital modelling was used to assess the impacts of different climate change scenarios, focusing on the tourism and fishery industry. The model assessed three adaptation options: reactive (with mostly physical coastal protection such as sea walls), integrated adaptation (including green infrastructure such as the use of coral reefs and mangroves to protect the coastline) and the third option of no action. These three options were subject to two climate scenarios. The results from the NCA calculations showed that integrated adaptation had the highest net benefits including the highest benefits for tourism, fisheries and carbon storage.

essential to weigh trade-offs among sometimes competing development and natural resource management agendas. Well designed natural capital accounts can help in this regard. Box 3 illustrates how Belize has used natural capital accounts to assess different approaches for climate resilient coastal development.

Accounting for climate finance

According to Article 9 of the Paris Agreement, developed countries need to provide transparent and consistent information biennially on financial support provided and mobilized for developing countries through public interventions. Article 9 also notes that this will be done in accordance with methods, procedures and guidelines yet to be

established. As such there is a need for information standards around climate finance and expenditures.

Measuring climate adaptation and mitigation expenditures is now an emerging priority in a number of countries. Through a tool called the Climate Public Expenditure and Institutional Review, over 20 developed and developing countries are quantifying their climate expenditures.⁹ In some countries this is then being institutionalized within the budget process to track climate expenditures over time — for example Nepal now issues an annual climate budget statement as part of its overall budget.

Complementing country efforts to measure adaptation and mitigation expenditures, the SEEA 2012 includes

a chapter on 'environmental activity accounts and related flows'. Specifically, Chapter 4 provides guidance on how to record 'environmental' transactions between economic units such as businesses, households or government entities. This includes environmental protection expenditure accounts and environmental goods and services sector. The SEEA 2012 does not dwell on climate change, but the classifications and tables on environment related expenditures along with environment related

activities are a useful reference, helping to fill an important methodological gap in this area. The use of environmental activity accounts coupled with related expenditures could potentially help countries monitor climate finance flows by source and type of environmental expenditure. Furthermore, the use of the SEEA 2012 as an international statistical standard would allow comparison between countries as part of global stocktakes.

Notes

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