Policy Briefing

WAVES
Policy Briefing
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Summary

Natural capital accounting (NCA) improves our understanding of how ecosystems or natural capital become wealth. It helps identify dependencies and risks: sectors with a high reliance on ecosystems are also exposed to uncertainties from climate change. NCA can be a tool to inform the design of instruments, such as payments for ecosystem services, that promote better resource management.

Background

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Showing the worth: NCA and the design of payments for ecosystem services

Natural capital accounting (NCA) is a valuable tool for policymakers, helping to identify who benefits from ecosystems and which sectors of the economy are better placed to share the cost of protecting them. This is of paramount importance in the design of realistic payment for ecosystem services (PES) programs, as it highlights sources of sustainable conservation financing. NCA can also show where investing these resources would generate the greatest economic returns. Lastly, NCA is a transparent, methodologically robust method that allows for comparisons across time and regions to assess policy impacts, when updated on a regular basis.

- NCA shows which sectors are more dependent on different ecosystems and their services, and are therefore more vulnerable to changes.
- NCA reveals a monetary value for ecosystem services. This is not a 'true' value, but can be an indicator of how sectors of the economy benefit from ecosystems and their potential ability to pay for these services.
- This information can be used to design different management policies in line with their impact across economic sectors, and not as isolated instruments.
- Transparency and periodicity of data collection through NCA allows for policy evaluation and feedback for instrument design.

Natural capital is the stock of ecosystems (renewables, like forests, water, farmland and biodiversity, and non-renewables like minerals). It provides benefits to people in the form of flows of goods and services over time, such as food, timber, fibre, energy, clean water, clean air and protection from hazards — all of which contribute to development.

From ecosystems to wealth

Ecosystem services are the benefits that natural ecosystems provide to people and the economy.[1] Some of these benefits are 'tangible' products, such as timber for construction from forests or drinking water for our homes, for which we pay. Benefits such as these are directly counted in gross domestic product (GDP). Other services — clean water filtered by forests or wetlands, for example — are provided indirectly, usually open access and 'free', by healthy ecosystems.

Many ecosystem services are used by people and industries and are reflected in GDP as they enter the economy, but their contribution is not attributed to ecosystems. For example, the value of pollination is reflected in crop production, but is not recognized as a benefit provided by ecosystems. Because it is 'free' and has no market value, there is no incentive to protect and maintain the ecosystems that support it, such as meadows for bees and insects. Perversely, GDP increases when some ecosystem services decline and must be artificially replaced, for example when a water treatment plant must be built and operated to replace the filtration services that had been provided by a wetland.

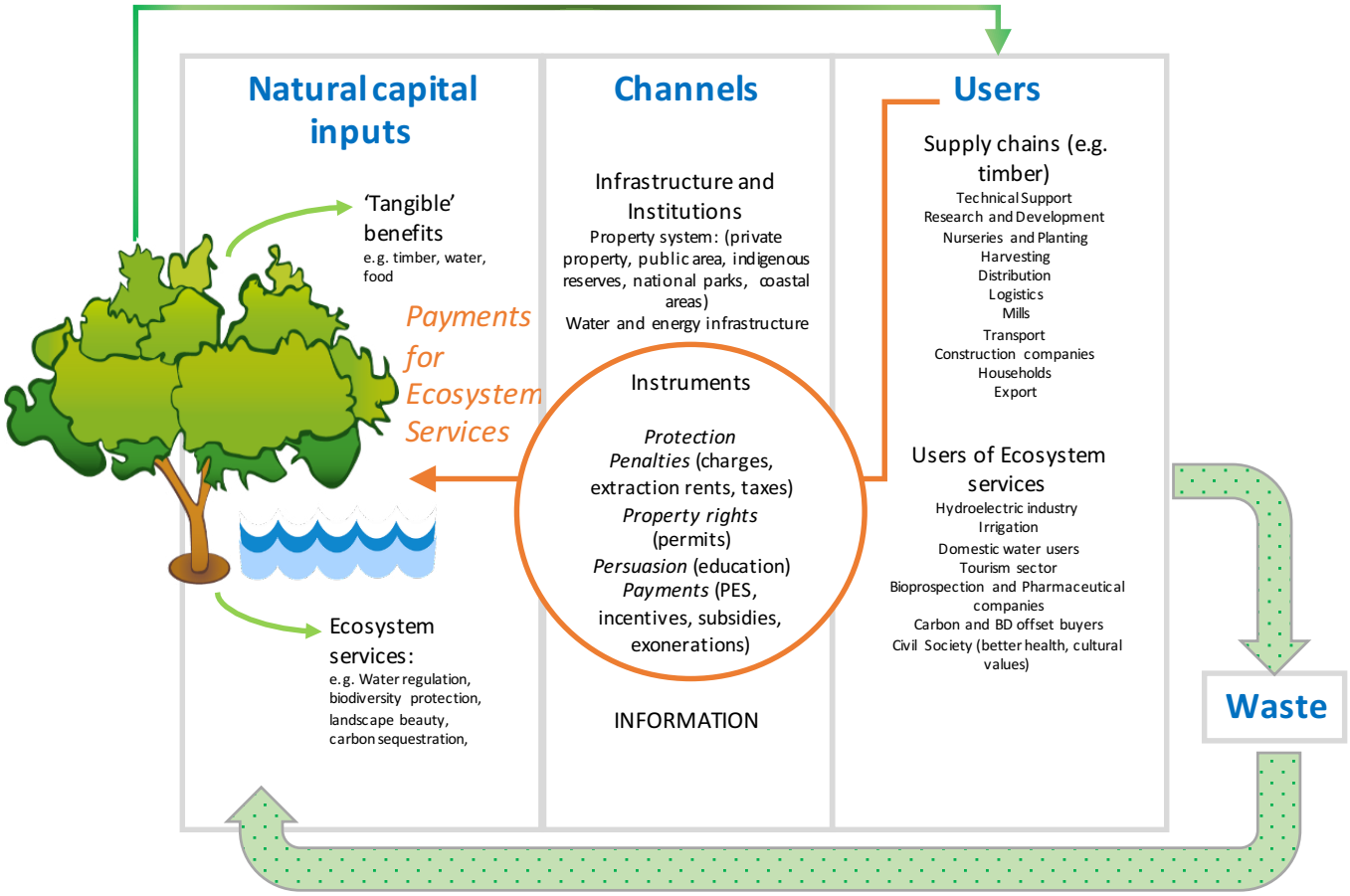
Fixing incomplete market signals

Governments use different types of mechanisms to correct market signals. Some of these include the 'five Ps':[2] prescription (laws), penalty (taxes and fines), persuasion (education), property rights and payments (incentives and transfers). Payments for ecosystem services (PES) is one such instrument. These are payments to landholders for managing ecosystems in ways that benefit others. This provides landholders with an incentive to maintain the natural capital that provides ecosystem services. Besides compensating landholders, the mechanism often

Information on how people benefit from ecosystems, and by how much, as well as the costs associated with protecting them helps to improve the design of programs.

Services such as clean water filtered by forests or wetlands are provided indirectly, usually open access and 'free' by healthy ecosystems. Credit: Fotosculptor/Flickr.

Figure 1. Linking PES to a country's natural wealth. The design of instruments such as PES is not an isolated process: only by understanding the role that natural ecosystems play in generating wealth will it be possible to design instruments to change behavior. The accounting framework used by NCA provides a compatible methodology that links value creation from inputs to users, and becomes a useful tool to inform the design of PES



also engages those who benefit — the users of the services, such as water users — in sharing the costs of their protection. It can also provide a price signal for them to use the resources more efficiently.

Designing realistic policy instruments

Information is needed to understand the biophysical processes by which ecosystems provide goods and services to people and the economy.

Because these ecosystem services have traditionally been 'free', reaching an understanding of their value is difficult. Information on how people benefit from ecosystems, and by how much, as well as the costs associated with protecting them helps to improve the design of programs. It can help improve the financial sustainability and environmental effectiveness of the program. By providing information on ability to pay, for example, PES instruments can be designed to be more equitable (see Figure 1).

NCA to inform PES

Generally, the overall NCA process can inform the PES agenda in four ways:

1. **Ensuring transparency of supply, demand and productivity information across sectors**, where data are regularly collected rather than just when a project is planned. This information allows for comparison over time, across space, and between economic sectors, for example to understand resource use and dependencies across user groups or between multiple countries. NCA can provide information on how much of the resource is used by a given sector (eg hectares of timber or grazing land, cubic meters of water) and how it is linked to the revenues reported by each sector (eg in US$/$m^3$ of water).

   It is important to clarify that this information is not the value of the ecosystem service, as it refers only to its monetary value acknowledged within the economy. It does not include, for example, cultural values. However, it can provide an initial reference point, or feasibility check, for the dependence of the sector on the resource and whether there may be an ability to pay associated to productivity. It can also flag when there may be a problem that will require more specific data with higher spatial or temporal resolution if there are data gaps — for example, linked to flooding or discharge of pollutants.

2. **Aligning instruments to how sectors have an impact on the economy:** NCA can inform the design of legislation concerning regulation, taxes, incentives, rents, property rights and payments and their multiplier impacts across the economy. NCA also promotes an inter-sectoral agenda, moving away from isolated sectoral policies that favour an individual group of resource users towards better long-term landscape management.
3. **Better information to assess baselines** to quantify the additionality of management activities targeted at protecting ecosystem services (for example, by understanding the magnitude and direction of change before a measure is introduced).
4. **Better information for assessing the impact of investment in natural resources**, for example:
   - Potential for investing in new areas, such as clean energy and renewable construction materials, and realization of new investments in natural capital across industries
   - Offsetting carbon emissions, for example through Reducing Emissions from Degradation and Deforestation (REDD+) and international voluntary carbon markets
   - Inclusive financing for natural resources beyond traditional enterprises such as timber or ecotourism, with a financial sector that understands the economic benefits of long-term investments in natural ecosystems
   - Identifying potential savings in infrastructure, for example from sustainable landscape management that reduces the need to invest in water treatment or mitigates the need for new flood protection infrastructure.

What information is needed?

Information needs to support NCA and PES design depend on the ecosystem services under consideration and the nature of the resource management context (e.g. to improve water quality through watershed management, or to stop or reduce deforestation). Typically, at least three types of information are needed:[3]

- Biophysical indicators of existing service supply use and how they would change under alternative management options
- Economic information on the value of services and on the opportunity costs of alternative uses of the asset, and ideally
- Social information on the distribution of income and levels of wealth of all relevant stakeholders (i.e. ecosystem service users or beneficiaries, and owners or managers of the ecosystems providing the service) to reach equitable solutions.

In the case of carbon sequestration from forests, the information required may include forest cover and age of the trees (younger, faster-growing trees capture more carbon than mature ones), as well as changes in cover through time to estimate potential carbon losses. Water quality and regulation will require local hydrological information such as precipitation, vegetation cover, slope and soils.

Coastal mangroves provide people and biodiversity with valuable protection against rising waters and can be an alternative to man-made flood defences. Credit: Ina Porras/IIED.

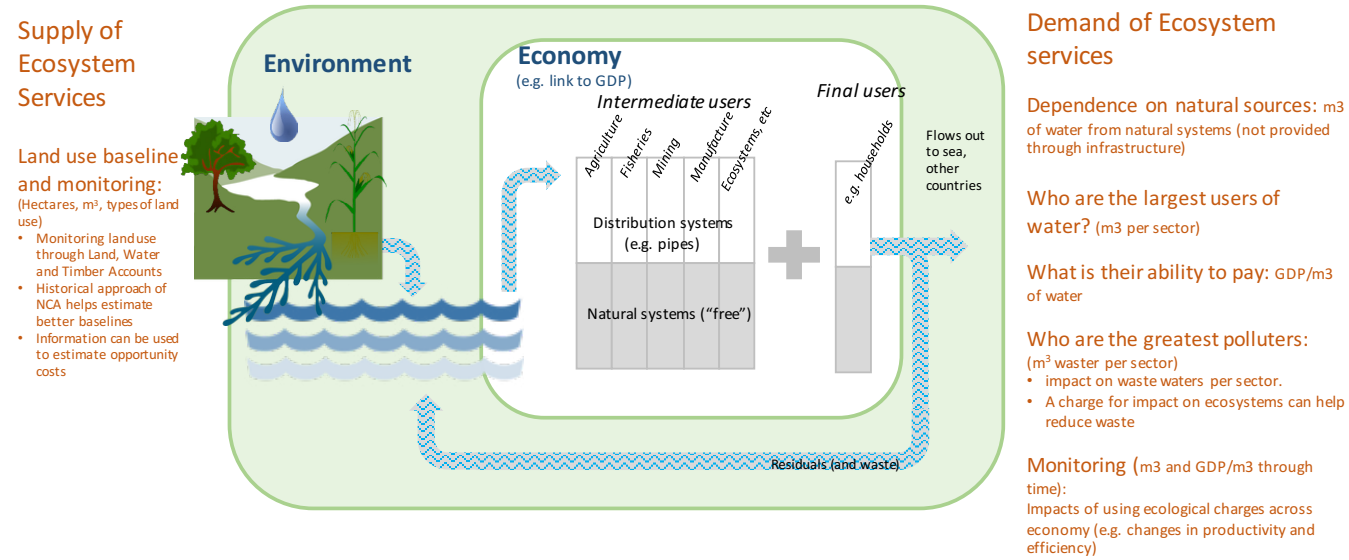
Economic information is critical to understanding who benefits from the service. Which ecosystems, and which processes within an ecosystem, are affecting a given set of actors/sectors of the economy, and what is the nature of this link? What is the level of their consumption (eg the demand for water flows or timber licenses)? What is the impact on their reported income (eg productivity in US$/$m^3$ of water)? This economic information can be linked back to the providers of ecosystem services by comparing it with information about the cost of ensuring protection of a resource, such as existing forests or wetlands, or of reversing activities that degrade these ecosystems.

This information can be fed into models to map or predict impacts on users from changes in the ecosystems, which would then inform negotiations about possible policies and instruments. Figure 2 shows the type of information that water accounts can provide to inform the design of PES for watershed management.

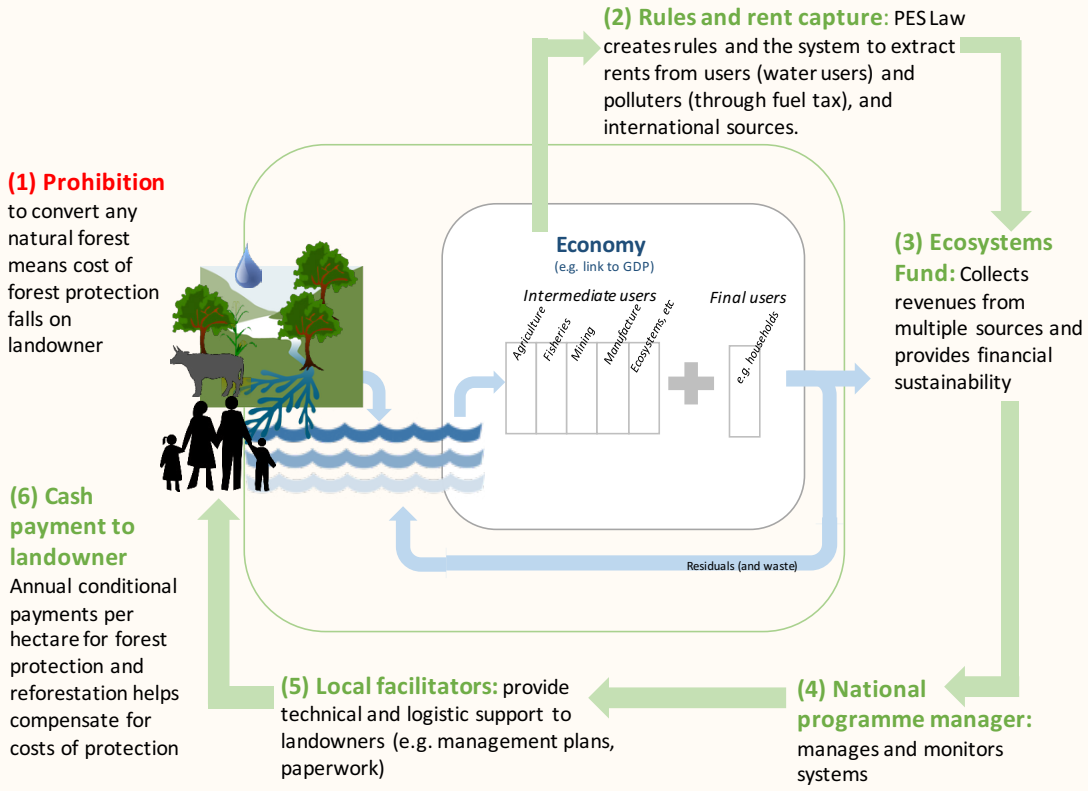
Better policy instruments through NCA

WAVES has been supporting local teams with the preparation of natural capital accounts in several countries, such as the Philippines, Botswana, Colombia, Guatemala and Costa Rica.

Figure 2. How water accounts can help inform PES and other economic instruments.
Water accounts can provide important information on water use and productivity per sector, to inform PES negotiations and monitor impact of policies.



The national Payments for Ecosystem Services program in Costa Rica



Costa Rica developed one of the first national payment programs for ecosystem services in the world. Its legal structure creates the basis to capture rents from beneficiaries of ecosystem services. It also provides the logistical framework to allocate these payments back to landowners. The recent introduction of NCA provides a better picture of how forest protection contributes to the economy. Its long-term perspective can also help assess baselines and additionality of protection efforts.

Some of these sets of accounts include:

- Land accounts describing land cover and its changes
- Water accounts providing information on water quantity
- Forest accounts for timber and forest cover in natural forest and plantations
- Ecosystem accounts, including carbon sequestration, fish production, water quality indicators, sediment loading, flood retention and soil erosion regulation.

The process to build the accounts has provided a platform to assemble quantitative information, identify and fill gaps, and set up a system to track changes over time. They show important information on the links between ecosystems and the economy. For example, accounts in the Philippines show the economic impacts of flooding

and how these compare to the cost of management options, such as flood defenses, relocation of homes or prohibitions on locations for future development. In Guatemala, natural capital accounts show a drastic decline in forest cover, with 95 percent of forest extractions not controlled.

PES and more

This information can help policymakers understand how demand for resources increases over time and how degradation affects the economy. A better understanding of the role of ecosystems and natural resources in the economy can contribute to the design of regulatory and market instruments, such as laws, prices, taxes, or transfer mechanisms such as payments for ecosystem services.

Notes

1. MEA. 2005. Ecosystems and human well-being: biodiversity synthesis, Washington DC. www.millenniumassessment.org
2. Salzman, J. 2005. Creating markets for ecosystem services: notes from the field. New York University Law Review 80:85.
3. United Nations. 2015. System of Environmental-Economic Accounting 2012. Central Framework. United Nations, European Union, Food and Agriculture Organization of the United Nations, International Monetary Fund, Organisation for Economic Co-operation and Development, and The World Bank
4. Ahlroth, S.E. Forthcoming. Pilot ecosystem account for the Laguna de Bay Basin (draft). The World Bank, Washington, DC

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Wealth Accounting and the Valuation of Ecosystem Services (WAVES) is a global partnership led by the World Bank that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts.