



Summary

Natural capital accounting can be used to help assess the economic viability of marine and coastal management plans, potentially supporting the development of more resilient coastal economies. Putting natural capital accounting into practice is in its early stages, but as governments build skills and experience, the methodology will develop.

Background

This briefing was written by Essam Yassin Mohammed from the International Institute for Environment and Development and Ben Milligan from University College London with input from Mike Beck, lead marine scientist at The Nature Conservancy.

Using natural capital accounts to inform marine and coastal ecosystems policy


Marine and coastal ecosystems provide a range of critical 'ecosystem services', from biodiversity and culture to carbon storage and flood protection.¹ Yet pollution, overfishing, climate change and habitat destruction² are rapidly degrading these ecosystems, putting cities and communities, water quality and livelihoods at risk. Using natural capital accounting (NCA) to work out the full value provided by marine and coastal ecosystems and the losses attributable to development activities could inform policies for sustainable management.

The main messages that emerge are:

- Improved understanding of marine and coastal ecosystems values and functions can help in assessing the economic and environmental feasibility of development projects.
- Effective natural capital accounting and consequent policy decisions informed by the NCA data can contribute to healthy and resilient marine and coastal ecosystems and build the resilience of the millions of communities that rely on them.
- To start using NCA as a tool, the most pragmatic approach would be to tailor a 'quick-start' guide and gradually improve the methodology as accounts are constructed, starting with a few ecosystem services such as coastal protection, fish production and tourism.



Marine and coastal ecosystems and the goods and services they provide are being rapidly degraded as a result of pollution, overfishing, climate change and habitat destruction.

 Restoring mangrove forests on coastal Bali. Credit: Lawrence Hislop, www.grida.no/photolib

Conventional approaches to measuring wealth and economic development, such as Gross Domestic Product (GDP), do not adequately take the values of these goods and services or the degradation of these ecosystems into account. The United Nations System of National Accounts, for example, does not fully capture the status and benefits of marine and coastal ecosystems.

Markets generally value only a small subset of the many benefits of marine and coastal ecosystems (that is, fish harvests), with other benefits (eg flood protection and climate regulation) poorly understood and undocumented. As a result, government and other decision makers often do not have all the information when deciding how to manage and develop these ecosystems. This has contributed to the over-exploitation of these resources, reducing the level and quality of goods and services that they provide.³

For example, wetlands and mangroves can provide valuable flood protection, but 30 to 50 per cent of wetlands have already been lost and 19 per cent of mangroves were lost between 1980–2005. Coral reefs provide a vital habitat for many marine species yet 75 per cent of the world's coral reefs are now threatened. These trends and the consequent loss of a multitude of marine and coastal ecosystem services will continue unless the values of these services are accounted for in policy and management decisions.⁴

NCA calculates the value of ecosystem services, and the UN System of Environmental-Economic Accounting (SEEA) provides a standardized framework for accounts. It is being used, experimentally, to value marine and coastal ecosystems in a growing number of countries including Australia,⁵ Belize,⁶ Madagascar,⁷ Namibia,⁸ South Africa,⁹ The Philippines¹⁰ and European Union member countries.¹¹

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In Australia, the Bureau of Statistics is currently piloting accounts for the Great Barrier Reef and its watershed. These incorporate physical and monetary measures to capture the ecosystem's conditions and the associated flows of goods (eg fish) and services (eg flood protection). In Belize, accounts for marine and coastal ecosystems are progressively being incorporated into government statistics and have been used to develop a national Integrated Coastal Zone Management Plan.

In the Philippines, work is underway to develop accounts for mangrove ecosystems and regional ecosystem accounts for the Laguna Lake and Southern Palawan regions. Despite this considerable progress, marine and coastal ecosystem accounting remains at an early stage of development.

Using ecosystem accounts to manage a sustainable future for the Great Barrier Reef

The Great Barrier Reef is a World Heritage site and is thought to provide a habitat for over 1,500 fish species, 133 varieties of sharks and rays, and more than 30 species of whales and dolphins. It is a significant magnet for international tourism, contributing more than AUD 5 billion to the Australian economy each year and generating about 68,000 jobs. However, the health of this global treasure is declining and reef managers have been searching for ways to establish data monitoring systems to enhance management effectiveness.

Australian statisticians are piloting ecosystem accounts for the reef area. These accounts can provide a snapshot of the economic value of some reef-based industries but can also estimate some of the costs associated with human impacts. Data related to biodiversity, land cover, water pollution, coral health, sea grass and other areas is collected in a systematic and comparable manner, highlighting some of the connections between the drivers of degradation, reef health and the benefits derived from the reef.

Although climate change and its direct and indirect impacts (including tropical cyclones, coral predation by crown-of-thorns starfish and coral bleaching)¹² represent the major long-term threat to the reef, evidence shows that more immediate damage is being caused by pollution from activities on the land, which is creating run-off that is high in nitrogen and sedimentation.

Calculating the costs to reef health associated with declining habitats and biodiversity would help managers make decisions about the acceptability of human activities. It would also provide guidance to industries and local communities when considering the economic viability of a range of activities.

Adapted from Australia's pilot ecosystem accounts benefit management of Great Barrier Reef, December 2014, www.wavespartnership.org

How accounting can support marine and coastal policymaking

Identify sustainable approaches to economic development

NCA can support marine and coastal policymakers to identify environmentally and socially sustainable approaches to development. Coastal policy and coastal zone management aims to balance three broad categories of valuable assets:

- Assets arising from economic activities, including transport, energy and communication infrastructure, buildings, equipment and machinery
- Assets that contribute to societal wellbeing including education and skills, health, and institutions and communities
- Natural assets or 'natural capital', including individual living and non-living components of the environment, (eg air, water, stone and soil) and the way these different components interact as ecosystems.

Natural assets provide the goods and services that are essential for human wellbeing and development, and represent the foundation on which other types of assets are built.

Historically, marine and coastal policymaking has not adequately taken the value of these assets into account. Conventional policy frameworks for marine and coastal development have tended to prioritize the conversion of marine and coastal ecosystems into other forms of wealth such as hotels for tourists or aquaculture farms in place of mangrove forests. As a result, these ecosystems have been damaged. Figure 1 illustrates how this approach is unsustainable because it results in the net loss of the foundational natural asset base of marine and coastal economies and societies.



Figure 1. Unsustainable (undesired) development of oceans and coasts

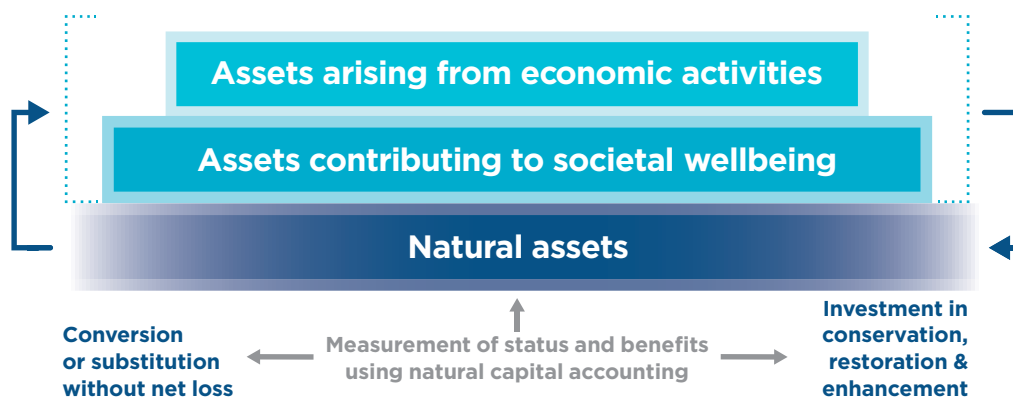


Figure 2. Sustainable (desired) development of oceans and coasts

In contrast, sustainable development requires policies that find ways to preserve natural assets, converting or substituting natural assets without net loss, and investing in efforts to conserve, restore and enhance the flows of goods and services that natural assets provide.

Figure 2 shows how natural capital accounting supports the sustainable development of oceans and coasts by providing policymakers with information concerning the status and benefits of relevant natural assets, and how these are being affected by human activity.

Specific policy and management applications

Natural capital accounting also supports marine and coastal policymakers to maximize the benefits of specific policies and interventions. The approach can be useful in several ways:

Assessing the economic viability of coastal development plans

Traditional coastal development projects often (if not always) ignore or underestimate the role played by coastal ecosystems. In other words, policymakers assessing development projects fail to recognize the opportunities lost when ecosystems are degraded.

This means that the calculations that underpin coastal development decisions are often incomplete.¹³ Consequently, valuable natural assets are being lost.

NCA offers an opportunity to reverse this trend by factoring in the economic gains and losses of undervalued coastal ecosystems, mainstreaming them into national economic accounts.

Calculating the full impact of a shrimp farm in Sri Lanka

A conventional cost benefit analysis for a 42 hectare shrimp aquaculture development in the Rekawa Lagoon system, Sri Lanka, revealed that the benefits of the development were higher than the costs by a ratio of 1.5:1. However, when the wider environmental impacts were evaluated, the benefits were outstripped by the costs by a ratio of between 1:6 and 1:11.¹⁴

Informing marine and coastal management plans

One of the most critical questions that policymakers grapple with is what kind of marine and coastal resource management delivers maximum economic, ecological and societal net benefits. A number of policy options are available to protect marine ecosystems, such as creating marine protected areas or controlling fishing activities (eg by restricting boat size or limiting the type or number of fish caught). These options can be used in combination (eg restricting fish net size, and banning fishing for a specific species during a certain period) to achieve the desired effect.

Ideally, policymakers would weigh the cost and benefits of each policy option, and so gain a better understanding of the multiple ecological, social and economic benefits that may arise. Improving understanding of the economic values of marine and coastal ecosystems and integrating (or mainstreaming) these into national accounts also helps direct investments towards conserving, restoring and enhancing these resources.

Building resilience in coastal regions

Healthy or restored marine and coastal ecosystems can provide a cost-effective, sustainable way of helping reduce people's vulnerability to economic and environmental shocks. The negative effects of climate change, including sea level rise, flooding and more frequent coastal storms, will continue to affect millions of people who live in coastal regions and depend on marine resources to survive. Simply restoring ecosystems such as mangroves, wetlands or coral reefs, or complementing them with shoreline hardening and engineered defences such as dykes can provide valuable protection. A study¹⁵ that compared damage caused by typhoons before and after mangrove forest restoration programmes in northern Vietnam found that damage to dykes was reduced by up to US\$295,000 per year — savings that represent more than the costs for mangrove planting. There were also substantial overall savings (US\$15 million) due to avoided risks in the communities at large.



 Parrotfish, coral reef, Mu Ko Lanta National Park, Thailand. Thailand's reefs support 4,000 species of fish.
Credit: Peter Prokosch, www.grida.no/photolib

Hilsa fish stock restoration in Bangladesh

In response to an abrupt decline in the fish catch of one of the most important fisheries in Bangladesh, the government decided to fence off certain areas as sanctuaries and provide compensation to local fisheries for loss in earnings. The Ministry of Finance created two new financial lines (6605 and 5390) for hilsa production and conservation in the national budget, and has started allocating money regularly through these new codes.

In 2014–15 the government allocated Tk 33.07 million to the Department of Fisheries (DoF) under 6605 for mobile courts (to enforce fishing restrictions), awareness raising, capacity building, and distribution of revenue for the hilsa alternative income generation activities (AIGA) programme.

Overall, transfers to the DoF have increased from Tk 270.79 million from the revenue budget and Tk 51.58 million from the development budget in 1998–99 to Tk 1.6 billion and Tk 170.00 million respectively in 2013–14.

This is an example of a government recognising the importance of a natural resource to the national economy and to the livelihoods of millions of people and making significant investment to recover and conserve it.

As the case is made and capacity to use natural capital accounting increases worldwide, NCA data could be used to build an even stronger bid for investment.

Opportunities and the way forward


There has been a common focus on the technical skills and institutional arrangements needed to implement natural capital accounting (including the monitoring and data requirements) among researchers and national governments alike.

Governments could seek to identify and fill technical and institutional capacity gaps before implementing natural capital accounting, or they could work with what they currently have. This means mapping out where skills and staff are in place and recognizing where there are gaps and then designing a system that works with the given capacity.

To start using NCA as a tool, the most pragmatic approach would be to tailor a 'quick-start' guide and gradually improve the methodology each time accounts are constructed. Starting with a few ecosystem services such as coastal protection, fish production and tourism is also more manageable. This should be accompanied by support to national governments for building their institutional and technical capacities.

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 Preparing for the day's fishing in Zanzibar. Credit: Yannick Beadoin, www.grida.no/photolib

Notes

1. Mohammed, EY (2012) *Payments for coastal and marine ecosystem services: prospects and principles*. <http://pubs.iied.org/pdfs/17132IIED.pdf>
2. Millennium Ecosystem Assessment (2005) *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.
3. See Note 1.
4. World Bank (2016) *Managing Coasts with Natural Solutions: Guidelines for Measuring and Valuing the Coastal Protection Services of Mangroves and Coral Reefs*. MW Beck and G-M Lange, editors. Wealth Accounting and the Valuation of Ecosystem Services Partnership (WAVES), World Bank, Washington, DC.
5. Australian Bureau of Meteorology (BoM) (2013) *Guide to environmental accounting in Australia*.
Australian Bureau of Statistics (ABS) (2015) *Information Paper 4680.0.55.001, An Experimental Ecosystem Account for the Great Barrier Reef Region*. www.abs.gov.au/ausstats/abs@nsf/mf/4680.0.55.001
Australian Bureau of Statistics (ABS) (2015) *Catalogue 4655.0, Australian Environmental-Economic Accounts, 2015*. www.abs.gov.au/AUSSTATS/abs@nsf/Lookup/4655.0Main+Features12015?OpenDocument
6. Statistical Institute of Belize (2012) *Abstract of Statistics 2012*. www.sib.org.bz/publications/abstracts-of-statistics; Invest scenarios case study. www.naturalcapitalproject.org/pubs/Belize_INVEST_scenarios_case_study.pdf
7. www.wavespartnership.org/sites/waves/files/images/Madagascar-fisheries-FINAL-1.pdf
www.wavespartnership.org/sites/waves/files/images/Country%20Report%20Madagascar.pdf
8. http://unstats.un.org/unsd/envaccounting/ceea/archive/Fish/Fisheries_Acc_in_Namibia.PDF
9. http://unstats.un.org/unsd/envaccounting/ceea/archive/Fish/South%20Africa_Fish%20Accounts_2010.pdf
10. <http://unstats.un.org/unsd/envaccounting/ceea/archive/Fish/Philippines.PDF>
www.wavespartnership.org/sites/waves/files/images/Policy%20Brief_Philippines%20Southern%20Palawan.pdf
11. www.ons.gov.uk/ons/guide-method/user-guidance/natural-capital/index.html
www.eea.europa.eu/soer-2015/europe/natural-capital-and-ecosystem-services
12. De'ath *et al.* (2012) *The 27-year decline of coral cover on the Great Barrier Reef and its causes*. www.pnas.org/content/109/44/17995.short
13. IUCN (2007) http://cmsdata.iucn.org/downloads/coastal_ecosystems_newsletter_july2007.pdf
14. Gunawardena and Rowan (2005) *Economic Valuation of a Mangrove Ecosystem Threatened by Shrimp Aquaculture in Sri Lanka*. <http://link.springer.com/article/10.1007/s00267-003-0286-9>
15. FRC (2011) *Mangrove plantation in Viet Nam: measuring impact and cost benefit*. www.ifrc.org/Global/Publications/disasters/reducing_risks/Case-study-Vietnam.pdf

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