**FURTHERING ECOSYSTEM-BASED MANAGEMENT**

Oceans cover almost three-quarters of the planet yet we are only beginning to discover the extent of the resources that lie beneath their surface. We are also only just starting to grasp the complexity of the interactions that connect ocean health to human well-being.

The ocean provides a variety of services estimated to have an annual economic value of US$24-trillion. Recently there has been expansion of ocean economies around the world as states turn to new opportunities for fostering economic growth. Yet the ecosystems that underpin much of this economic growth suffer from the largest knowledge and governance deficits.

The Benguela Current Large Marine Ecosystem, spanning the West coast of South Africa, Namibia and Angola, has benefited from a long history of trans-boundary research and co-operation and is the first large marine ecosystem to formalise this co-operation into a legally binding agreement, the Benguela Current Convention (BCC), signed by South Africa, Namibia and Angola. A primary aim of the BCC is to further the implementation of ecosystem-based management, which aims to maintain ecosystems in a healthy, productive and resilient condition so that they can provide the services society wants and needs.

**GOVERNANCE**

Modern ocean governance is based on the principles of sustainable development, which embeds social and economic systems in the ecological systems it recognises as foundational (Figure 1). For effective governance, we need information on all three of these systems and a measure of their relative value.

“*The ocean provides a variety of services estimated to have an annual economic value of US$24-trillion.*”

**FIGURE 1: THE IMPORTANCE OF ECOLOGICAL SYSTEMS**

Sustainable development recognises the importance of ecological systems and places social and economic systems within them.
ECOLOGICAL & ECONOMIC FEATURES OF THE BENGAUL

- Powerful Luderitz upwelling
- 3000km coastal region with fur seal distribution
- Whale species occur over the continental shelf
- Skeleton coast dune belt
- Coastal lagoons home to migratory birds
- Vital fish stock estuaries
- Aquaculture including mussels, abalone & oysters in protected bays
- Oil and gas, particularly off the coast of Angola
- Diamonds from southern Angola through Namibia to South Africa's northern Cape
- A large scale commercial fishing industry is supported by the abundance of pelagic & demersal fish species in the Benguela region
- Ecological & economic features of the Benguela

- AGULHAS
- RING
- BENGUELA REGION
- CONTINENTAL SHELF
- UPWELLING ZONE
- POWERFUL LUDERITZ UPWELLING
“Ecosystem-based management” has become globally acknowledged as the primary framework for the management of sustainable development – and ecosystem services – in coastal and ocean environments.

In 2015, the United Nations (UN) developed 17 Sustainable Development Goals. Sustainable Development Goal 14 on Oceans and Seas, was adopted to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

To effectively implement Sustainable Development Goal 14, ocean governance frameworks need reddefining so that they are based on the sustainable use of ecosystems. This requires measuring and monitoring ecosystem goods and services, particularly the value of the services unpinning the blue economy. It also requires new governance institutions to guide and integrate social, economic and ecological decision making and provide the required leadership, skills and capacity.

In the context of fisheries, an ecosystem-based approach takes into consideration the ecological relationships between species affected by the fishery and balances the diverse needs and values of everyone who uses the ocean now – and in the future. The ecosystem-based approach is now accepted as the preferred way to manage fisheries, and since adoption of the World Summit on Sustainable Development in 2002, the signatory countries – which include Angola, Namibia and South Africa – have been required to implement this approach to fisheries management.

“A healthy ocean sustainably delivers a range of benefits to people now and in the future. Thus, any ecosystem process or service that contributes to maintaining ocean health – and in turn, human well-being – can be considered valuable to people.”
Ocean Health Index

The Ocean Health Index is a composite measure of ecosystem and human well-being. It considers ocean health as a function of 10 ecological, economic and social goals (figure 2). The index is based on measures of sustainability, and values both conservation and extractive use. Each goal is scored along four dimensions: current status, direction of change (i.e., trend), existing pressures, and expected resilience in the near-term (the next five years). The Ocean Health Index focuses on the near-term because this time period is most relevant to policy-makers.

The goal for food provision, for example, is to maximise the sustainable harvest of seafood from fisheries and marine aquaculture. Countries are scored higher for maximising sustainable seafood production and lower for unsustainable practices and under-utilising their resources. Fisheries and aquaculture are tracked separately before being weighted by the proportion each contributes to food provision, and then combined.

**FIGURE 2: THE 10 GOALS OF THE OCEAN HEALTH INDEX**

- **FOOD PROVISION**: from sustainably harvested or cultured stocks
- **ARTISANAL FISHING OPPORTUNITIES**: for local communities from sustainable practices
- **NATURAL PRODUCTS**: including pharmaceuticals and decorative materials that are sustainably extracted
- **CARBON STORAGE**: in coastal habitats
- **COASTAL PROTECTION**: from inundation and erosion
- **TOURISM & RECREATION**: opportunities
- **LIVELIHOODS & ECONOMIES**: for coastal and ocean-dependent communities
- **SENSE OF PLACE**: from culturally valued iconic species, habitats, and landscapes
- **CLEAN WATER**: and beaches for aesthetic and health values
- **BIODIVERSITY**: of species and habitats
VALUING ECOSYSTEM SERVICES

Ecosystem valuation means the process of assigning a value to society – economic, cultural, aesthetic or otherwise. Valuing ecosystem services can be useful when managing trade-offs between economic activities competing for the same space.

ECOSYSTEM ACCOUNTING

Ecosystem – or environmental – accounting is a novel discipline that provides a framework for analysing the environment and its relation to economic and human activities. By incorporating standard economic measures of natural capital into economic accounting, ecosystem accounting provides a more comprehensive evaluation of the wealth and well-being associated with the ecosystem.

Ecosystem accounting uses the same scientific foundations as biodiversity planning and national biodiversity assessments but it applies tried and tested accounting and statistical tools to translate this science into an accounting framework. This generates information that can be used in a wider range of socio-economic contexts.

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The Experimental Ecosystem Accounting system is currently being developed by the United Nation’s System of Environmental-Economic Accounts (SEEA), whose Central Framework was adopted in 2012 as an international standard for environmental accounting. It deals with individual environmental assets, such as water, minerals, land, timber and fish – not entire ecosystems. SEEA’s Experimental Ecosystem Accounting is the first step in developing a statistical framework for ecosystem accounting.
ECOSYSTEM SERVICES

Ecosystem services influence human well-being directly, through use or experience of the service, and indirectly, via the impacts of supporting and regulating services on other services and environments.
The Benguela Current Convention provides a platform for integrated ecosystem governance and is working with stakeholders in Angola, South Africa and Namibia to implement these recommendations.

There is a need to define, value and monitor ocean health, and to develop a method to assess trade-off decisions between sectors for sustainable economic growth. A consolidated database is needed to support the informed decision-making critical to ecosystem-based management, including trade-off decisions.

Specific recommendations to be considered by the BCC include:

- Support coordinated implementation of ecosystem-based management.
- Coordinate research and monitoring.
- Facilitate sharing of lessons.
- Develop standardised methods for data collection and analysis.
- Establish joint positions for international meetings.

### Figure 3: Critical Monitoring Gaps in the Benguela Region

**Ecological**
- Impact of bulk sediment extraction
- Benthic coupling
- Fisheries independent data
- Bycatch monitoring
- Indices for monitoring climate change
- Habitat mapping

**Economic**
- Ecosystem evaluation
- Valuation of non-market ecosystem services
- Sectorial economic data e.g. contribution to GDP, employment, ecosystem asset value and economic yield over time

**Social**
- Measures of resilience, vulnerability and wellbeing
- Poor use of local knowledge
- Contribution to food security nationally and locally

### Contact

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