COMMENTARY

Ocean Accounts: Status and Challenges

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1. INTRODUCTION

With increased focus on ocean-based economic development, the preparation of ocean satellite accounts (also known as marine economy satellite accounts or core ocean GDP accounts) is slowly gaining importance. It is the process of combining data on ocean-related economic activities to provide an ongoing, comprehensive picture of how ocean and coastal resources can be used for a variety of purposes (Colgan 2022). The ocean economy is varied; yet, very little beyond fishing, marine transportation, and some oil and gas production is accounted for. Ocean accounting is another, more comprehensive way of looking at the value of coastal and marine assets. The Global Ocean Accounts Partnership (GOAP 2022) defines it as "integrated records of regularly compiled and comparable data concerning ocean environment assets". Ocean accounts follow a structure similar to existing national accounts and are compatible with the System of National Accounting (SNA) and the System of Environmental Economic Accounting (SEEA). Ocean accounts can bring the ocean into official statistics.

2. CRITICAL AREAS THAT NEED ATTENTION IN THE ASSESSMENT PROCESSES

Traditional accounting processes provide information on how various activities contribute to the economy, especially through the exploitation of resources (e.g., mining or fisheries). However, they neither take into

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account the contributions of natural ecosystems in supporting these activities nor negative externalities such as pollution, habitat degradation, and habitat loss.

Increased inter-sectoral conflicts in coastal and marine regions have led to the conceptualization and implementation of programmes such as Integrated Coastal Zone Management (ICZM) and Marine Spatial Planning (MSP). In the long term, both ICZM and MSP aim to balance environmental, economic, social, cultural, and recreational objectives, all within the limits set by natural dynamics (Commission of the European Communities 2000). To ensure that integrated management has an impact across sectors, policies, and levels of administration, implementing bodies employ various processes, such as zoning, permits, and other spatial and temporal management interventions. In India, ICZM plans have been prepared for select stretches in the states of West Bengal, Odisha, and Gujarat, and pilot activities have been implemented. ICZM was also mentioned as a vital strategy in India's Intended Nationally Determined Contribution commitments (UNFCCC n.d.)

The blue economy—defined as the sustainable use of ocean resources for enhancing economic growth and livelihoods while preserving the health of the ocean ecosystem—has gained significant policy traction in India. This has led to two significant events: the formation of a Blue Economy Coordination Committee by the Ministry of Ports, Shipping, and Waterways (MoPSW), Government of India, in 2024 as a mechanism to achieve the coordination, integration, and harmonization of initiatives in the blue economy (BE) domain and to prepare a draft policy on the blue economy. India's draft policy on blue economy defines it as "a subset of the national economy comprising of the entire system of ocean resources and man-made economic infrastructure in marine, maritime and the onshore coastal zones within India's legal jurisdiction, which aid in the production of goods and services and have clear linkages with economic growth, environmental sustainability and national security" (GoI, 2020:12) The Blue Economy Working group, in their National Accounting Framework for the Blue Economy and Ocean Governance, conservatively estimated the size of the BE in India to be about 4%[1] of its GDP, taking into account the four major sectors of agriculture, fishing and forestry, mining and quarrying, and industry and services. The draft policy on the BE also states that while mainstreaming the BE in future estimates of national income and GDP, the

[1] In contrast, Kumar *et al.* (2022) estimated the total value of coastal and marine ecosystem services in India for the year 2012–2013 to be ₹1.9 trillion (or US$ 0.11 trillion, in purchasing power parity terms), which constituted about 2.4% of India's net national product in 2013.

extent of possible damage caused to marine ecosystems and the environment needs to be estimated; this would clarify the need for ocean accounting.

Important BE sectors include marine fishing, marine biotechnology, offshore and deep-sea mining, marine tourism and leisure, shipping, port and maritime logistics, marine construction, marine renewable energy, marine manufacturing, marine commerce and information and communication technology (ICT), and marine education and research. But for these activities to be sustainable, the environmental component must also be taken into consideration.

Ocean accounting is important and useful on many counts, as it

- helps us understand the role of oceans and coasts in the economy;
- acts as a mechanism to monitor the investment in, and net returns from, ocean activities;
- serves as a tool to understand how external events, such as storms, climate change, and environmental changes, can impact BE development; and
- helps identifying new areas for investment and innovation.

These functions of ocean accounting support evidence-based policy- and decision-making, providing direction in ocean stewardship and governance (Ebarvia 2016).

For example, in an area with considerable acreage of mangrove forests, the BE policy may call for the development of a large port to boost the local economy. Despite the area's proneness to cyclones, local communities may not have been impacted, as they would have been sheltered behind thick mangroves. The development of the port and the eventual growth of industries and settlements would alter land-use patterns, resulting in the loss of mangroves and associated wetlands as well as changes in water quality. This could trigger coastal erosion, making the region highly vulnerable to rising sea levels and inundation.

If ocean accounts for that area were available, then the changes in value provided by the different components would be known. Potential changes in the stocks and flows of ecosystems in the area—including the impacts of human activity and climate change due to the development of the port—could be effectively modelled. This would ensure that ocean account components—such as carbon sequestration (blue carbon reporting) and support services (e.g., nurseries for fish)—reflect the existing stocks and flows of ecosystems, indicating that locating the port elsewhere would make

considerable economic sense. Ocean accounts can therefore inform policy decisions that are sustainable in the long term, especially through ICZM and MSP.

3. GLOBAL EXPERIENCES AND THE INDIAN PERSPECTIVE

Several countries have initiated discussions to develop ocean accounts in different ways. So far, the frameworks developed by most countries tend to focus on facilitating the use of existing data sources or specifically addressing national accounting challenges. Ten of the 14 countries that were originally part of the High Level Panel for a Sustainable Ocean Economy produce tourism satellite accounts, while two, Portugal and Canada, have dedicated ocean satellite accounts (Fenichel *et al.* 2020). While Portugal's ocean account seems to be one of the most advanced, it also highlights errors that can occur from linking industries to the ocean for perceived benefits. For instance, its ocean accounts include insurance, presumably against ocean storms, which are a cost of the ocean and not a benefit.

A pilot study in the Netherlands compiled experimental physical ecosystem accounts for the Dutch part of the North Sea based on the SEEA Experimental Ecosystem Accounts (EEA) framework. It presents an advancement towards paired physical and monetary asset accounts (Schenau *et al.* 2019). There have also been advances in visualizing and displaying data to inform policy better. Norway has developed an interactive dashboard to represent its ocean proto-account (Yale School of Environment n.d.). Digital dashboards can help disaggregate statistics and improve accessibility to indicators of interest.

The Government of the Republic of Maldives is developing natural capital accounts through pilot tests of the SEEA Ecosystem Accounting (EA) framework in Laamu Atoll, an ecologically sensitive and economically important area in the southern Maldives (GOAP 2023a). This is expected to generate valuable information on the health and productivity of the region's ecosystems and the ways in which they contribute to the local economy and people's well-being.

India's ocean accounting efforts can be strengthened by drawing on key learnings from international experiences and adapting them to the Indian context. India has already begun compiling ecosystem accounts under the SEEA Ecosystem Accounting (EA) framework. The Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES) project, funded by the EU, has helped develop a database of studies on ecosystem

valuation, which could be further refined for ocean accounting purposes. As per the Strategy for Environmental Economic Accounts 2022–2026, India plans to explore the links between ICZM and ocean accounts (MOSPI 2021). The National Statistical Office (NSO) of India has also joined the Global Ocean Accounts Partnership with the aim of developing systems to quantify the contribution of ocean ecosystem services.

Two interactive dialogues on ocean accounting were held in December 2021 (GOAP 2021) and May 2023 (GOAP 2023b) as part of the Australia–India Indo-Pacific Oceans Initiative Partnership (AIIPOIP). In July 2023, India's Ministry of Statistics and Programme Implementation formed a multi-sectoral group bringing together various central ministries, research institutions, and eminent experts to develop a national framework for ocean accounts. The group was aligned with the SEEA-EA and aimed to capture changes in ocean extent, condition, services, and assets over time. The two main features of the Ocean Ecosystem Accounting (OEA) framework (GoI 2025) proposed for India are (a) the identification of mangroves, coral reefs, seagrass, estuaries, lagoons, sandy coasts, coastal ocean water, and mudflats as key ecosystems; and (b) the directive to follow a tiered approach for compiling extent and condition accounts. The first tier would include core parameters that are readily available and can be consistently monitored; the second tier would include detailed, granular, ecosystem-specific indicators.

Following the OEA framework, coastal states are being encouraged to develop state-level ocean accounts. They must form inter-departmental groups, with the Directorate of Economics and Statistics in each state serving as the nodal agency to strengthen coordination and streamline data flow. At the same time, the National Centre for Coastal Research, in collaboration with the World Bank, has completed a pilot study on ocean accounting for the state of Tamil Nadu in 2025. Other pilot studies are being planned to further ocean accounting in India.

4. CHALLENGES AND WAY FORWARD

The implementation of ocean accounting could pose several challenges. Drawing upon international experiences and existing commentaries on the subject, the following challenges must be considered while preparing India's ocean accounts.

4.1 Determining Scope

- *Setting geographical boundaries*: This is crucial when determining how accounts would record activities beyond the national boundary and de-

ciding how far inland the ocean economy extends (Fenichel *et al.* 2020).

- *Deciding which sectors to capture in the ocean economy*: Frameworks such as the UN Technical Guidance on Ocean Accounting for Sustainable Development, which draws upon SNA and SEEA, could be consulted for further direction and clarity. Caution must be exercised to avoid double-counting. Simply reorganizing data on the ocean economy from the main sequence of national accounts would not change the value of the GDP, as this does not extend the income boundary.

4.2 Data Limitations

- *Data resolution, sharing mechanisms, and costs of data collection*, etc. Currently, the institutional structure for data and cost sharing between institutions and ministries that collect ocean-related data needs functional clarity.

- *Incomplete accounts*: Though these are still capable of informing policy and locating data gaps, efforts must be made to improve data resolution and provide consistent inputs to refine datasets and methods. There is a need for investments in long-term data provisions that would feed into the accounts regularly.

- It is important to note that local data is best suited for local use, while coarser data at a national level is more suited for national policy development and management. For application at the local level, specific issues of interest need to be targeted.

- A consistent methodology compatible with international standards is required for periodic data collection in order to maintain comparability across time.

4.3 Valuation of Goods, Services, and Assets

- While many techniques are used for the valuation of the goods and services provided by oceans, for consistency with existing accounting practices, NCAVES and MAIA (2022) provide guidance on the preferred order of valuation methods to be used when preparing accounts using the SEEA-EA framework.

- Since there are no inherent transactions associated with the values obtained from the stated preference (non-market) methods, they are typically not preferred methods for ecosystem accounting, including ocean accounts. However, if there is interest in estimating non-use values, it may be possible to use choice experiments and contingent

valuation techniques after making necessary adjustments for consistency with exchange value principles.

4.4 Lack of Expertise and Knowledge

- This could delay implementation and potentially hinder the adoption of the OA framework at the local level. Technical support and expertise could be provided using common knowledge-sharing platforms.

4.5 Diverse Stakeholder Expectations

- *Dilution of objectives:* This would significantly impact the usefulness of the account.
- Identifying and targeting key stakeholders first and then gradually expanding focus, if necessary, would be a good way to manage expectations and outcomes.

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